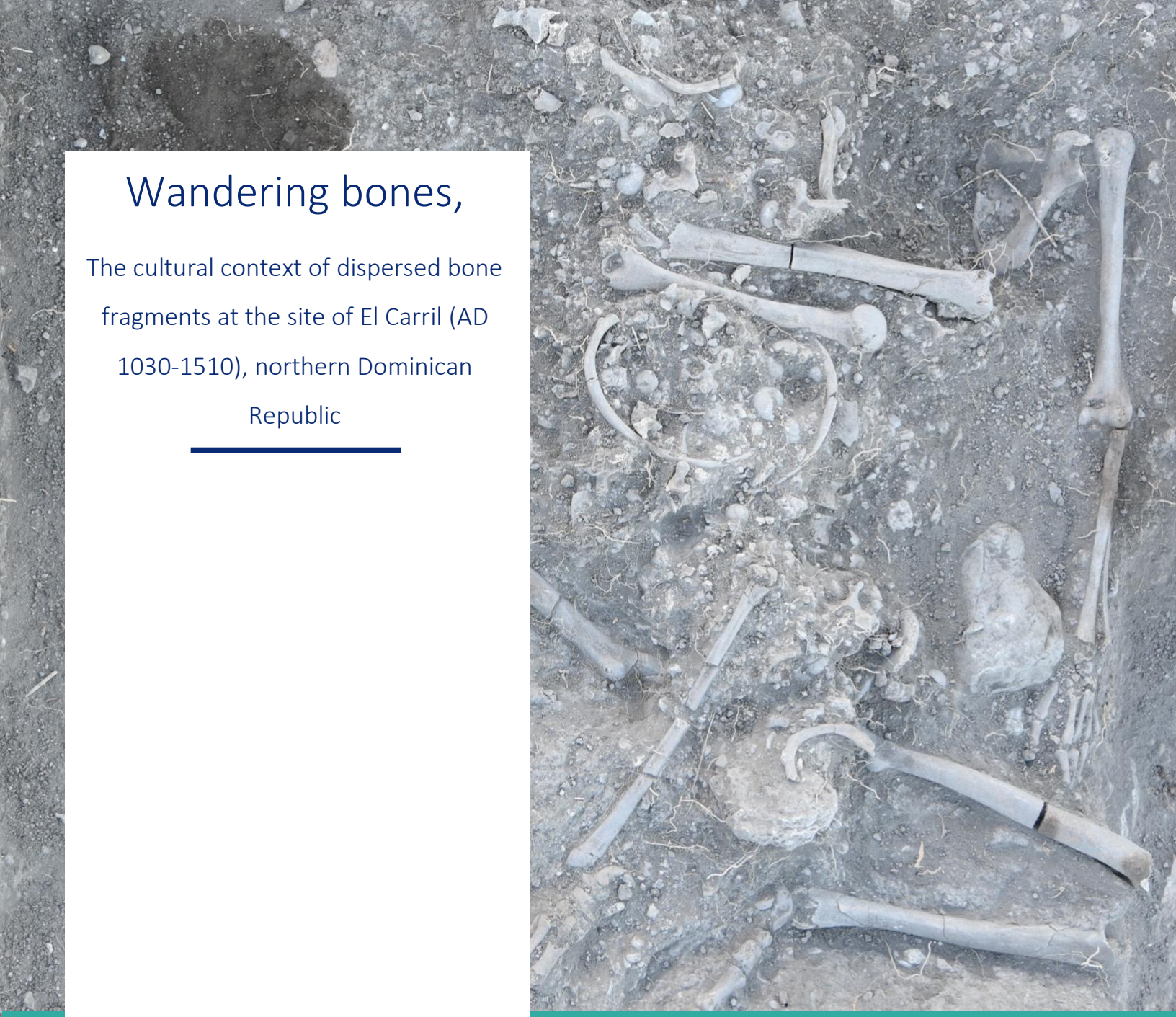

Wandering bones,

The cultural context of dispersed bone fragments at the site of El Carril (AD 1030-1510), northern Dominican Republic

FEBRUARY 5 2020

BA3 Thesis

Authored by Nina Schoon

Universiteit Leiden

Source picture: Picture of burials from El Carril F04-01. The burial of F04-01 is missing the cranium, and the long bones are rearranged into a non-anatomical position (NEXUS1492 database)

Wandering bones,

The cultural context of dispersed bone fragments at the site of El Carril (AD 1030-1510), northern Dominican Republic

Nina Schoon

S2010011

BA3 thesis

Supervisor: Prof. dr. C.L. Hofman

Caribbean archaeology

The University of Leiden, Faculty of Archaeology

Leiden, December 2020, final version

Acknowledgements

First and foremost, I would like to thank my supervisor, Corinne Hofman, for helping me find this compelling subject and for the tremendous aid in seeing to the completion of this thesis. I would like to acknowledge Menno Hoogland for helping me with the funerary and osteoarchaeological aspects of this thesis. Additionally, I would also like to thank the team of the NEXUS1492 project for helping me collect all the information needed to perform the research and for the fantastic (and gruelling hard work) times we had during the fieldwork in the Dominican Republic.

Furthermore, I am grateful to my friends and fellow students as they made my student years incredibly fun and provided many discussions from which I learned a lot. You have always helped me whenever I had a question or was stuck with an assignment or subject.

Lastly, I would like to thank my family for the tremendous support they gave throughout the period of the study. They listened to my ramblings on about the things I had learned and always stayed positive and supportive of my choosing archaeology.

Contents

List of figures

Chapter 1: Introduction

1.1 Introduction and problem statement

The Caribbean islands were colonized by communities from the American continent as early as 6000/ 5000 B.C (Keegan and Hofman 2017, 23). Trinidad, Cuba, Hispaniola and Puerto Rico are the islands with the oldest known human settlements (Keegan and Hofman 2017,24; Dacal Moure and Rivero de la Calle 1984: 75-76; Pagán Jiménez *et al.* 2015). Early research was mainly based on cultural characteristics around lithic classifications; however, the evidence was too scarce and often not agreed upon by the different researchers. As a result, the academics failed to reach a consensus on a clear definition of the period. The Lithic Age is contrived using these classifications. The Lithic Age started and ended at different points in time for various researchers as they worked on different sites. Stone tools worked from a core distinguished the Lithic Age. The Archaic Age succeeded the Lithic Age, 5700-200 B.C. and for the majority of the cases, the dates of the Archaic and the Lithic Age overlap. The Archaic Age is defined by lithic flakes and ground-stone tools, an alternative to the blades and the shell tools of the Lithic Age. Furthermore, the Archaic is characterized by the absence of ceramic vessels. For this reason, this time is also revered to as 'pre-ceramic' or 'a-ceramic'. These periods, however, still pose problems given that they are too generalizing (Keegan and Hofman 2017, 23-50) and ceramics have been recently found in several Archaic Age sites across the Caribbean (Hofman and Antczak 2019). Funerary rituals dating back to the Archaic and Lithic Age are found at Banwari Trace sites on Trinidad. The Trinidadian communities, The Alaka and El Conchero, had funerary rituals with the secondary burial of long bones and crania in shell middens (Boomert 2019, 124-128).

Around 800 and 200 B.C., a new wave of colonizers from the South American continent entered the Caribbean islands. These colonizers were probably part of the Arawakan linguistic family (Keegan and Hofman 2017, 11-14; Naegale *et al.* 2020). The Arawak culture brought a new cultural system, coined as the Saladoid series. The commencement of the Saladoid also meant

the inception of the Ceramic Age (Keegan and Hofman 2017, 51-54). The period after the Saladoid, the post-Saladoid, was divided up into two phases, the first phase commenced with the disappearance of Saladoid ceramic series and the emergence of Troumassoid pottery in the Lesser Antilles and Ostionoid pottery in Puerto Rico and the Greater Antilles. The second phase is marked by the conversion towards Suazoid and Cayoid pottery in the Lesser Antilles and the so-called "Taino" culture in the Greater Antilles (Keegan and Hofman 2017, 95).

The Saladoid culture is suggested to have had an egalitarian tribal-based social structure. Through the years, the Caribbean islands went through a cultural change from the Saladoid occupation to the post-Saladoid occupation. This change also entailed economic, spatial, social and cultural reformations. In late Saladoid society (A.D 400 to 600/800), social hierarchy became more apparent. This change was due to the growing contact networks of the chiefs and shamans between communities and kinship becoming less pronounced. This way, specific individuals of a community could get a higher status in the hierarchy (Keegan *et al.* 2013, 350; Ensor 2013, 90-91). Together with the social changes, the configurations of the settlements changed. Initially, this was considered as a process of three consecutive steps; 1.) before social complexity the settlements were randomly placed throughout the landscape; 2.) as with the process of increasing social contact settlements started to cluster together in pairs; 3.) plaza communities emerge, and the settlements cluster around such plazas (Keegan and Maclachlan 1989:623-627). Considering recent research regarding this subject, this explanation previously suggested is somewhat arbitrary. Joshua Torres (2005) proposes an alternative explanation for the changing settlement patterns. He proposes settlements became increasingly aggregated, as described in the third step of the traditional approach, due to the increasing social links people formed with people from other settlements. Existing settlements broke up and aggregated in other locations close to other neighbour settlements because of these persisting social relations. Ritual behaviour incorporating the surrounding community and landscape further cemented a community feeling.

Burial traditions associated with the Saladoid have been documented on several islands of the Lesser Antilles, with notable examples at the site of Golden Rock, St. Eustatius. The burials found at the site of Golden Rock mostly cluster in a centralized area called a plaza, the location of the plaza was to the north of the house complex. These burials were related to several

ceremonial deposits. (Versteeg and Schinkel 1992; Versteeg *et al.* 1993, 155). A change in burial tradition marks the transition to the post-Saladoid in the small islands of the Lesser Antilles and Puerto Rico. Funerary practices during the post-Saladoid varied greatly from island to island, settlement to settlement and even within the settlement burial treatment varied. Most prevalent burial traditions were primary inhumation, primary partially rearranged, secondary burial and fully disarticulated human bone deposits (Hoogland and Hofman 2013). A change is also noticeable in burial location by a decrease of burials in centralized burial locations and an emphasis on burial locations in mounds and in and around the house (Keegan *et al.* 2013, 350; Ensor 2013, 90-91; Curet and Oliver 1998, 222-226; Keegan *et al.* 2013; Hofman and Hoogland 2004; Hoogland and Hofman 2013; Mickleburgh *et al.* 2019, 159). With burying the dead in the household area strengthened the lineages between the living and the dead and (Hageman and Hill 2016, 47-49). Examples of burials in mounds surrounding the house, or within or next to the house have been documented at the post-Saladoid or Late Ceramic Age sites of Monserrate (Puerto Rico), White Marl (Jamaica), Anse à la Gourde (Guadeloupe), and Kelbey's Ridge 2 (Saba) amongst others (Curet and Oliver 1998, 222-226; Hofman *et al.* 2018, 460; Hoogland and Hofman 1993; Keegan *et al.* 2013; Mickleburgh and Wescott 2018, 158; Mickleburgh *et al.* 2019, 159; Roe *et al.* 1990, 344; Curet and Oliver 1998, 224). Besides primary and secondary burials, dispersed and fragmented human remains were found in several of these sites. These were isolated bones, often fragmented long bones or parts of or whole crania, which not in context with a burial but scattered throughout the site or in the midden or refuse deposits. On the other hand, several researchers observed that a portion of the excavated burials in the region misses skeletal elements (Allsworth-Jones 2008, 124-126; Roe *et al.* 1990, 350-351; Hoogland and Hofman 1993, 171-170; Hofman *et al.* 2018, 460; 457; Hoogland 1997, 8; Hoogland 1998; Hoogland 1999). Some scholars attribute these missing remains to preservation or excavation bias (Redfern 2008). However, other scholars suggest cultural practices like the post-mortem retrieval of skeletal elements caused this phenomenon of missing skeletal elements from grave contexts (e.g. Hoogland and Hofman 2013). Such practices could also have led to the dispersal of fragmented bones and thus contribute to the phenomenon of missing skeletal elements from a burial (Outram *et al.* 2005, 1700). However, in most contexts within and outside of the Caribbean, these dispersed bone fragments have been regarded as a result of natural shifts in the soil or to be just a result of

recent human activity (like ploughing), and therefore needs no further study (Pokines *et al.* 2013).

Worldwide, similar occurrences of dispersed and fragmented bones have been occasionally documented archaeologically as well as in ethnohistoric and ethnographic accounts (e.g., Booth and Madgwick 2016; Kanungo 2011; Kuijt 2008; Frayer and Martin 1977). However, a comprehensive compilation of the multitude of practices that relate to the deposit of dispersed human bones is hitherto not available.

1.1.1 Dispersed bone fragments in the northern Dominican Republic

The sites of El Flaco and El Carril in the northern Dominican Republic, date to the Late Ceramic Age, i.e., between AD 1000-1500. The deceased in both sites are buried in mounds adjacent to the levelled areas where evidence for structures, in some cases houses, have been found. Both the removal of skeletal elements from the burial as the dispersion of fragmented bones has been documented. This documentation is present for El Flaco (Weston 2017), but is forthcoming for El Carril, partially as part of this thesis. There is a pre-assumption that the two phenomena are closely linked to each other and may be related to complex multistage burial practices. This thesis seeks to argue that the dispersal of fragmented human remains in the sites cannot merely be regarded as a result of natural- or recent human- activity, but should be interpreted in light of socio-cultural practices. To gain a proper understanding of the actual actor influencing these remains and subsequently resulting in their dispersal throughout the settlements, these isolated bones require detailed and comprehensive research. This research should include osteoarchaeological, archaeological, ethnohistoric and ethnographic research. This thesis will subject the dispersed human bone fragments from the site of El Carril to such research.

1.2 Objectives

This research aims to provide a better understanding of the mortuary practices in the Caribbean by studying the dispersed and fragmented human remains at the site of El Carril in the northern Dominican Republic. To achieve this, this research employs osteoarchaeological

(osteological and macro trace) analysis and a comparative study of archaeological, ethnohistorical and ethnographic information. Multistage burials are intricate and require meticulous study from both a methodological and cultural aspect. It is combining these different lines of study that facilitates a better understanding of the cultural practice of dispersed human bone fragments. An ultimate aim is to set an example for further research in this field and propose an alternative way of looking at dispersed human bone fragments in a site as part of the funerary practices. This way of performing research will enable scholars to address the broader significance of death-ways in a particular society. Not only will this be useful in the Caribbean, but it may also spark interest for similar studies in other regions of the world.

1.3 Research questions

This research proposes the following main research question:

What agents contribute to the distribution of fragmented human bones at the site of El Carril, northern Dominican Republic, and how can this be understood in a cultural context?

Suggesting the following sub-questions:

- What is the distribution of the fragmented human bones at El Carril and can a pattern be discerned?
- Do the bones bear macro traces of subaerial exposure or other surface modifications and are the traces on the bones in accordance with the context they are buried in?
- Does this pattern concerning macro trace analysis and spatial distribution of the dispersed and fragmented bone deposits, fit with the pattern found at other sites in the Caribbean?
- What can research in other parts of the Caribbean or the world about cultural practices related to dispersed and fragmented human remains in the archaeological, ethnohistoric or ethnographic record and how can they help to better inform the funerary practices at the site of El Carril?

1.4 Methods and approach

This research will use osteoarchaeological (osteological and macro trace) as well as archaeological, ethnohistoric and ethnographic sources to contribute to a better understanding of the dispersed human bone fragments bones at the site of El Carril. Osteological research will aid in discriminating patterns of bias towards individual bones groups and age groups. Sex is indeterminable based on the photographic evidence available at this moment. Comprehension of the above will contribute to the construction of a cultural profile that could inform about the specific burial practices administered to specific individuals.

The analysis of macro traces is based on the premises of tracing the different processes that have acted on bones throughout the removal and dispersal process. The condition of the isolated human bones can vary significantly depending on geological or archaeological context (White and Folkens 2005, 49). Environmental factors leave markers on the bone that are indicative for specific kinds of activity. By studying these macro-and micro markers, depositional context can be reconstructed and give an additional perspective on the deliberateness of the deposit of the object (Pokines and Symes 2014, 8; Ubelaker 1997, 81; Duday 2009, 6). However, macro traces is not the only method to secure information. Numerous studies, as mentioned above, rely only on macro trace/ taphonomic analysis as methods of obtaining information. This tendency often neglects the cultural context, which makes the research more generally applicable. Ultimately, archaeology is meant to be a study of past human societies which argues further for the inclusion of cultural context in archaeological interpretation.

Archaeological, ethnohistorical and ethnographic information from the Caribbean and other regions in the world will provide a framework to understand this cultural context of the dispersed human bone fragments and better inform the funerary practices at the site of El Carril.

1.5 Thesis outline

In chapter two, the site of El Carril will be introduced, and the previous research performed at the site will be summarized. This chapter will explain the importance of this research at the

site of El Carril in the framework of the ERC-synergy NEXUS1492 project and the archaeological investigations in the northern Dominican Republic, specifically at El Flaco. Chapter three will provide an overview of the methodology used in the research. The methodology brings together multiple lines of inquiry, ranging from osteoarchaeological analysis to literature research. In chapter four, the results of the osteoarchaeological analyses will be presented. The analysis consists of both an osteological and macro trace study. To contextualize the results from the study of the El Carril dispersed human bone sample, chapter five will present the results of the archaeological, ethnographic and ethnohistoric literature study. This study is focused on the Caribbean and other parts of the world. Looking at occurrences of dispersed human skeletal remains from a worldwide perspective will provide invaluable information on the variety of funerary practices that may have been involved in the dispersion of human bone fragments. Chapter six will bring the results from chapter 4 and 5 together and provide a discussion within the framework of the questions raised in the introduction. A summary of the principal conclusions and possible avenues for future research are detailed in chapter seven.

Chapter 2: The site of El Carril in the context of the NEXUS1492 project

2.1 The excavations in the context of NEXUS1492

The excavations at El Carril and El Flaco in the northern Dominican Republic were led by Prof. dr. Corinne Hofman and dr. Menno Hoogland as part of NEXUS1492 between 2013 and 2019. However, archaeological research at El Carril is ongoing. NEXUS1492 is supported by the European Research Council (www.NEXUS1492.eu). NEXUS1492 (2013-2019) formed a collaboration between researchers from Leiden University, the VU and the University of Konstanz. The project aimed to contribute to a novel narrative on the impact of European colonization on the indigenous inhabitants of the Caribbean. Currently, what is known of Caribbean history is dominated by a Eurocentric perspective based on the early chroniclers. The NEXUS1492 objectives are to uncover the legacies of the indigenous inhabitants of the Caribbean islands. Examples of the subjects studied are; the transformations in landscape and its use; consumption patterns; funerary rituals; changes in (material)culture and its dispersion throughout the Caribbean; persistence of indigenous culture and knowledge and the degree to which it is still practised on the islands (Hofman and Ulloa Hung 2019, 97-98).

Research techniques employed include, invasive as well as non-invasive material studies on human and animal remains, starch grain and phytolith analysis, lithic analysis, pottery analysis, isotope analysis, aDNA, remote sensing and ground-penetrating laser. Other scientific fields NEXUS1492 operate with include; network science, forensic science, history, anthropology and museum and heritage studies (Hofman *et al.* 2020, 135). Involvement and exchange of knowledge between local communities and different stakeholders are instrumental as the project aims to contribute to the awareness of indigenous histories (Hofman and Ulloa Hung 2019, 97-98).

The research has produced a substantial amount of information about the Indigenous-European interactions concerning the transformations of the landscape and (material)culture. The NEXUS1492 project documented more than 300 sites in the northern Dominican Republic in the period it was active. Most of these indigenous sites were found at clearings in the forests, on open fields in mangrove areas and in caves or abris (Hofman *et al.* 2018). By researching the landscape, many of the transformations made by the colonizers have been tracked (Castilla Beltran *et al.* 2018, 2020). The Indigenous people practised ancestral agricultural techniques, using small house gardens and exploitation of the forest resources (Pagán Jiménez *et al.* 2020). When European colonizers entered the island, they began the process of cutting down large plots of the forest to make way for large farms to cultivate large amounts of monoculture crops—coincidently launching the encomienda system. This system enforced large numbers of indigenous peoples to work on such farms. This process caused many sites to be abandoned as their native inhabitants were moved around and forced to work on farms and in mines (Hofman *et al.* 2020, 136).

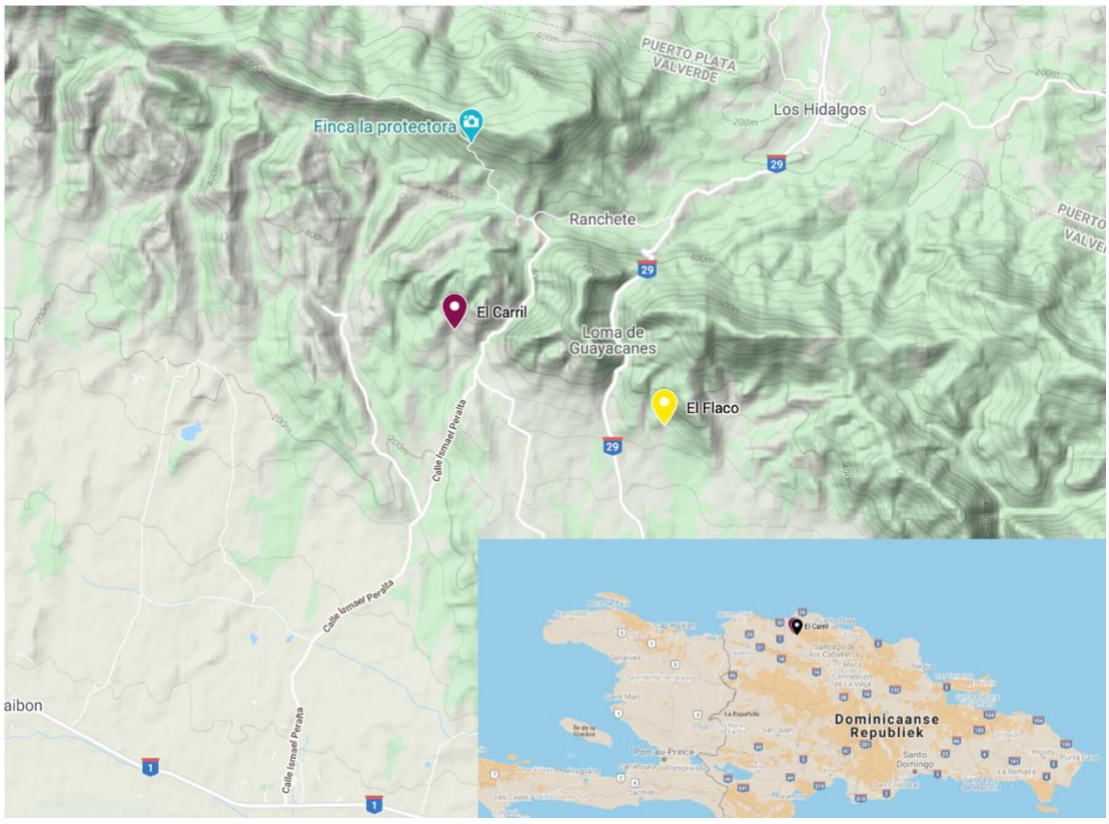

Figure 1 Map with locations of the sites of El Carril and El Flaco (Map by Nina Schoon made on Google MyMaps)

2.2 NEXUS1492 archaeological research in the northern Dominican Republic

Recent excavations by the NEXUS1492 project at the sites of El Flaco and El Carril in the northern Dominican Republic have documented burials in mounds with complex burial practices and a fair amount of fragmented human bones dispersed throughout the sites (Hofman *et al.* 2020, 141; Weston 2017, 6).

2.2.1 El Flaco

The site of El Flaco is situated between Los Hidalgos and Loma de Guayacanes on the Cordillera Septentrional, a mountainous range separating the coastal planes and the inland (figure 1.). The site is close to El Mirador de Colón, the location where Columbus crossed the mountainous range after which he could freely observe the Cibao Valley (Guerrero and Veloz Maggiolo 1988; Hofman *et al.* 2020).

Employing remote sensing techniques, for example, drones, robotic total station and geographical maps, the site of El Flaco was documented and assessed for the spatial organization (figure 4.). Using these techniques, the size of the site was determined to be around 1000 m^2. Between 2013 and 2016 the site was excavated by the NEXUS1492 project. El Flaco was explored prior to the NEXUS1492 project in 1980 by Fernando Luna Calderon and Glenis Tavarez (Hofman *et al.* 2020, 136).

The spatial configuration of El Flaco consists of levelled areas as well as earthen mounds and walls. The mounds and walls were built in the process of levelling out the areas where the houses and other supplementary buildings were constructed (figure 2). Excavating the levelled areas yielded floorplans of circular huts. From the posthole configurations in combination with similar information from other sites in the region suggest that these huts were usually used for a certain period after which they were destroyed, new huts were built in the same location or new plots of land were prepared (Hofman *et al.* 2020, 137-138).

Figure 2 Elevation map combined with excavation plan of El Flaco as collective result of the excavations between 2013 and 2016 (Hofman et al. 2020, 137)

Earthen walls and mounds surrounded the huts and auxiliary buildings at El Flaco. These human-built mounds are built up out of layers of domestic refuse alternated with layers of white caliche coming from the levelled areas (figure 3) and with sterile layers of dark brown soil. The refuse layers contain many faunal remains and discarded artefacts (e.g. ceramics,

adornos and beads). However, the presence of hearths, cooking areas and burials suggest that the mounds were not only used as refuse disposal but also for different household activities. Dense layers of ash were formed as a result of burned garbage between sterile layers of dark brown soil. The ash increased the soil fertility, and as such periodically, the mounds were also used as a kitchen garden (Hofman *et al.* 2020, 138; Pagán-Jiménez *et al.* 2020). The predominant ceramic style discovered at the site of El Flaco is associated with the Chicoid ceramic series. Chicoid pottery was manufactured between AD 1200/1300- 1490 and is characterized by a brown to black colour with delicate geometric, zoomorphic and zoo anthropomorphic designs. Earlier styles discovered at El Flaco are Ostionoid and Meillacoid and admixtures of both styles, these styles were manufactured between AD 800/900 - 1300 (Hofman *et al.* 2020, 143).

Figure 3 Stratigraphic profile of the south wall of unit 75 in a mound at El Flaco. The various layers and lenses (1-14) represent different deposit episodes and functional stages of the mound. From bottom to top: 1) weathered calcareous bedrock (90 per cent stones and gravel) in a silt matrix; 2) palaeosol; 3) refuse layer composed of land snails, ceramics and ash; 4) deposit of material from layer 1; 5) deposit of soil from levelled bedrock; 6) same as 3 but finer; 7) same as 5 but finer; 8) ash deposit; 9) same as 3 but finer; 10) ash deposit; 11) refuse deposit; 12) deposit of soil from levelled bedrock; 13) ashy refuse layer; 14) topsoil. (Image by Menno Hoogland.) (Hofman et al. 2018, 212).

The mounds also included human burials. In total, eighteen burials were found in three of the excavated mounds. The burial population consists of every age group; no bias towards a certain age could be identified (Weston 2017, 7-11). In several cases, the crania had been modified.

This practice manipulates the development of the cranium in childhood (Hofman *et al.* 2020, 138). Besides human internments, also one dog burial was found, which might suggest that a particular mortuary ritual wherein the dog played an integral part as a spiritual symbol (Shev 2017; Shev *et al.* 2020). The burials date between AD 1200 and 1490 (Hofman *et al.* 2020). Burial treatment varies significantly within the site, and evidence has been found to support single, and composite burials as well as primary and secondary burials. The removal of bones, in particular, the cranium and occasionally the long bones has been observed in several cases. The removal happened after a period of skeletonization (Hofman *et al.* 2020). It is suspected that these burials within the mounds would have a similar intention as those within the context of the house (Hofman *et al.* 2015).

Dispersed human bone fragments were found throughout the site, especially in context with hearths (Weston 2017, 6; 42). The bone fragments consist of 55,4% of cranial and dental fragments. Axial fragments represented only 13,1% of the secondary assemblage; the long bones were only 10% of the total; the hand and foot bones are merely represented for 2,7%, and 18,8% of the assemblage was fragmented beyond recognition (Weston 2017, 6-11). Some of these fragments appear to be burned. The total MNI was determined to be 72 individuals. Weston concludes that the El Flaco burial assemblage shows signs of the possibility of open-air excarnation after which individual bones were selected and retrieved and later re-deposited in a different context (Weston 2017, 39). In her report on the skeletal remains of El Flaco, Weston, presents three possible explanations for this phenomenon: 1) the dispersed human bones represent remains originating from the primary burials, 2) the dispersed human remains are composed of skeletal elements from one individual, 3) the dispersed human bones represent the remains originating from a small sample of individuals (Weston 2017, 39).

2.2.2 El Carril

The site of El Carril was identified by Emile de Boyrie Moya in 1950, and later further investigated by Marcio Veloz Maggiolo, Elpidio Ortega, Plinio Pina and Bernardo Vega in 1970 (Hofman *et al.* 2020, 136; Veloz Maggiolo *et al.* 1972).

The site spans approximately 53.000 m^2 and counts 125 mounds interspersed by levelled areas. The site of El Carril dates back to the precolonial period, with a mean date range of cal. AD 904-1452 and a period of intense occupation between cal. AD 1200-1260 (Hofman *et al.* 2020, 136, Hofman and Ulloa Hung 2019, 101-102; Pagán-Jiménez *et al.* 2020, 4). The site was mapped using elevation maps, drone documentation and satellite imagery (figure 4.) (Sonnemann 2016). Like at El Flaco, the mounds were built up out of several soil layers reflecting human activities like cooking, burial, crafting and gardening (Hofman *et al.* 2020, 139; Pagán-Jiménez *et al.* 2020). Layers of ash, alternated with layers of brown or black soil, layers of caliche and refuse from the area surrounding the house. Also similar to El Flaco, these refuse layers were sometimes burned creating layers or lenses of fine ash, presumably to create fertile soil to use these locations as a gardening plot (Pagán-Jiménez *et al.* 2020). The ceramics found in the mounds were mostly from the Meillacoid ceramic tradition; however, small amounts of Chicoid ceramics were found in the upper layers. In the lowest substrates, some Ostionoid ceramics were found; however, they were few in amount. Mixed styles of pottery are also prevalent, namely between the styles, Ostionoid-Meillacoid and Meillacoid-Chicoid.

The mounds at El Carril also included human burials. The total amount of inhumations discovered at the site within the mounds were ten burials. Most of the mound burials concentrated in the northern part of the excavation (see appendix figure 4). Some of the burials within the mounds have been part of a secondary burial ritual as most showed signs of modification after the deposit took place. A most common sign of modification was the removal of skeletal elements after skeletonization. The most observed skeletal element to be removed was the cranium, and sometimes the long bones (Hofman *et al.* 2020, 141).

In short, NEXUS1492 researches the influence of colonial contact on the native societies of the Caribbean. The two excavations of El Carril and El Flaco are part of this research project and are of particular interest as they are situated along the *Ruta de Colon.* These sites are contemporary to the years the initial Spanish expeditions launched. Theoretically, these sites could have been one of the first of these native societies to have had contact and subsequently have traded with the colonial forces. Both these sites display the same settlement pattern with El Carril being the larger site of both.

Furthermore, both sites display similar funerary practices, primarily the phenomenon of dispersed human bone fragments. A most apparent practise is the burial of individuals in the context of the house, within it or right next to it within the associated mound. More than occasionally, these burials seem to be disturbed at a later point after initial internment to receive secondary funerary treatment. This practice resulted in the absence of most often the cranium or long bones. Another practice is the displacing of the bones within the grave so they do not lie in anatomical association (as can be observed on the image on the front page).

The next chapter will explain the methods and materials used for the research to investigate what actor played a part in the dispersal of this dispersed and fragmented human bone assemblage.

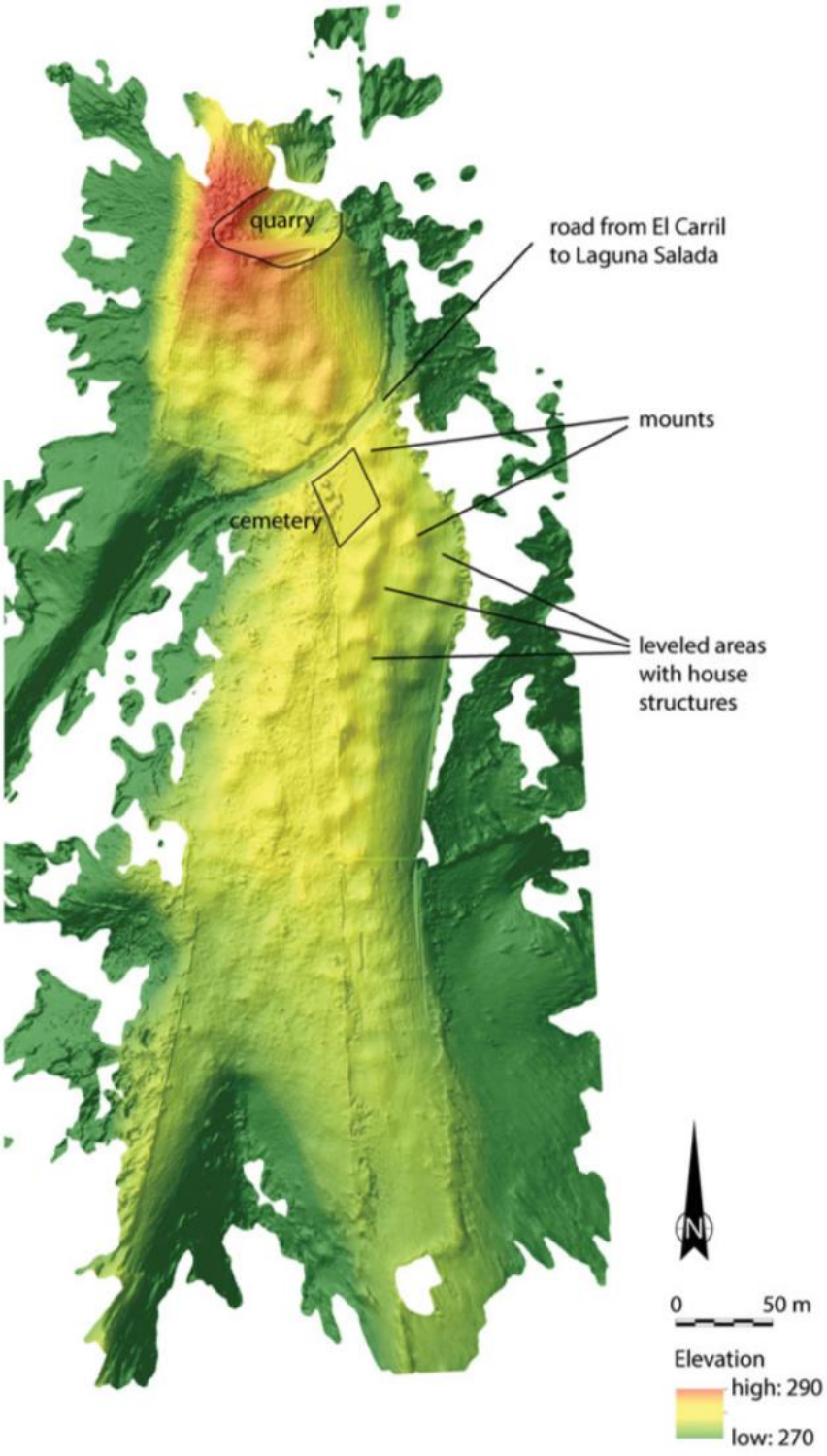

Figure 4 DEM image based on photogrammetry and topographic maps providing an overview of levelled areas and mound at El Carril map by Till Sonnemann and Sven Ransijn for NEXUS1492 (Hofman et al. 2018, 206)

Chapter 3: Materials, methodology and approach

This chapter presents the methodology applied in the research. As this research aims to propose new ways to study dispersed human bone fragments within a site, several methods are employed, from the fields of osteoarchaeology, archaeology, ethnohistory and ethnography. First, a database is made including an inventory of the dispersed bone fragments, and the osteological information of age groups, and remarkable features. Second, a distribution map was created to visualize the distribution of the dispersed human remains. Third, a preliminary macro trace analysis based on photographs was conducted to help shed light on the different stages the fragmented human bone remains went through up until their final deposit. The fourth stage of the research comprises a comparative study of burial practices from the Caribbean and other parts of the world to contextualize the El Carril case and to understand better the particular evidence of dispersed human bone fragments in a site. This mode of research is expected to reinforce the assumption that the dispersed and fragmented bones do belong to the funerary practices and are part of multistage funerary rituals where the removal of bones after skeletonization is known. For this aspect, archaeological, ethnohistoric and ethnographic information was collected.

The subsequent paragraphs will present the materials and explain the methods and approach used.

3.1 Materials

The site of El Carril yielded a total of 66 deposits of human remains of which only 10 were formal burials. The remaining bone material was found in isolated deposits and consisted of a total of 278 pieces of fragmented and disarticulated skeletal elements. Due to the recent outbreak of the Covid-19 virus travelling to the NEXUS1492 excavation laboratory in the

Dominican Republic is prohibited, which inhibited physical re-inspection of the bone fragments. This restriction limits the research in some respects as the study relies predominantly on photographs and data that was assembled in the database during the previous years. The photographs used in this thesis were taken by myself during the summer of 2019, whilst I was following the internship in the Dominican Republic. The NEXUS1492 project provided other pictures that were used. The data on the dispersed bone fragments comes from the NEXUS1492 database developed during the fieldwork seasons 2016-2019 at El Carril.

3.2. Creation of a database and distribution map

3.2.1. Database

A database with all the osteological information regarding the fragmented remains was developed. The data was gathered from different sources within the NEXUS1492 database and ordered in a concise and more efficient database to aid for this particular research. This database provides a good insight into the skeletal elements that are represented in the dispersed and fragmented human bone category. The database is composed of all the data available on the dispersed bone fragments. This information includes; the find number, location (zone, sector, square and level/layer), feature number and feature description and the osteological information (age identification). The find number is essential to include to attach the find to the information in the database easily. The location is vital to include enabling finding the location of the bone on the map more effortlessly. This will aid in finding relations with other disarticulated bone fragments as well as burials. The feature number and the feature description were not recorded for all finds, so they are not always present. Feature description is essential included to identify any structured deposits and characteristics that might point to a generalized practice of deposit. The age determination, however preliminary, does help with determining if an age bias is present. The identification of the skeletal elements is critical to determine if any bone groups are targeted, suggesting a bias toward individual bones. It will also be able to rule out or confirm if the dispersed bones are the result of non-human activity. The columns that are marked with orange are isolated bones found in close context with a burial (see appendix, figure 2).

The database will help to establish patterns and determine if certain bone groups are targeted or if the selection is random. If a pattern can be established the assumption of human involvement in the dispersion of these bones would be reinforced. This assumption is based on the concept that individual bones are targeted as they bear specific ritual significance or are the easiest retrievable after decomposition (Redfern 2008, 181-296).

The database will also aid in the recognition if the fragmented remains are deposited in a structured deposit (deposits that frequently share composition and are found in similar locations) (Redfern 2008, 282). A database also makes the information more concise and efficient, therefore more unambiguous.

3.2.2. Distribution map

With the help of a distribution map, created with the program Affinity Designer, the locations of the dispersed bone fragments on the site, their locations and specific human bone deposits are visualized. This map will aid in researching patterns (e.g. structured deposits) and if there are patterns to be discerned. Furthermore, the relation of the dispersed bone fragments to the formal burials will be researched.

3.3. Macro trace analysis

Macro trace analysis is performed in the context of the practice of archaeothanatology (Duday 2009). This practice is based on the sequence of disarticulation of the joint to try and determine the movement of a body during decomposition, ultimately resulting in the position the skeleton is uncovered. This field of science has made models, based on archaeological burials, experimental research and basic assumptions on joint durability. A particular use of this field is analysing decomposition of certain joints which can be used to determine if a burial is primary or secondary. This practice can also help determine if a burial was intentionally disturbed. The theory is that the body would be left out to skeletonize, and the first bones to detach (this would happen within several weeks depending on the climate and surroundings) were the easiest to retrieve and therefore were preferred. Another option was the excarnation by cutting away the flesh; this would leave cutmarks on the bones in characteristic locations

these will be introduced further in this chapter. Open-air desiccation and excarnation by removing flesh could also occur together (Mickleburgh and Wescot 2018; Duday 2009; Knüsel 2014).

To understand the assemblage found at the site of El Carril, it is fundamental that macro trace analysis is employed to understand the agents that acted upon these bones. The macro trace analysis will help determine if the markers on the bones can be attributed predominately to natural processes or rather to human processes. If the bones display signs of human alteration and if these alterations can be linked to cultural activity (White and Folkens 2005, 57).

The fragmented and disarticulated remains are inspected on biological, physical and human macro traces. Macro traces from pictures are not conclusive and will therefore be limited to the angles the pictures are taken in. However, this first assessment will be able to provide an educated guess as to what did happen to the bone.

Darlene Weston (2017, 39) writes in her report of the site of El Flaco that the fragmented remains at the site of El Flaco bear evidence consistent with subaerial exposure. This practice leaves particular macro, and micro markers behind that can be studied to establish if the same process has acted upon the remains of El Carril. These characteristics include:

- Weathering patterns to establish how long the bone has been exposed on the surface before being buried these will be scored using Miller (1975) and Behrensmeyer (1978) from WS0 to WS5. Other criteria that imply open-air exposure are explained in Mickleburgh and Wescott (2018)
- Bleaching from solar radiation as a result of exposure to direct sunlight (Pokines *et al.* 2013, 316).
- Cutmarks made by humans to remove tendons and joints from a bone to remove it from the skeleton. These kinds of cuts are made on distinct locations on the bone and quantified; these can provide evidence for the intentional removal of a skeletal element. For the identification of these cutmarks, Morlan (1984) will be used.
- Canid chewing marks will often result when bones are left outside during subaerial exposure. They are available, to a certain degree, to canid scavengers, which is hypothesized to be a part of the ritual (Redfern 2008, 295; Smith 2006, 679). Therefore

canid chewing marks might indicate the bones were subject to subaerial exposure. For the recognition of the marks, Smith (2006) will be used.

- Perimortem trauma dry fractures are fractures made when the bone has lost its organic content. The cause of these breaks could be the removal of bones after subaerial exposure and needing to cut or break near the joint as these are the last to break down (Roksandic 2002, 102). These kinds of breaks create characteristic patterns which could be a result of a secondary funerary ritual. To recognize these patterns Villa and Mahieu (1991) and Roksandic (2002) will be employed.
- Other marks that might indicate human interference, for example, adornment for ritual purposes or additional artefacts deposited in the same context. For the identification of these marks Sauer (1998), Behrensmeyer (1986), Olsen and Shipman (1988), Shahack-Gross *et al.* (1997), Shipman *et al.* (1984), White and Folkens (2005) and Huculac and Rogers (2009) will be used.

3.4. A comparative approach to multistage burial practices and dispersed bone fragments

To facilitate a proper understanding of the multistage burial practices and the phenomenon of dispersed bone fragments bones, a foundational understanding of practice is necessary. To accomplish this, examples of disarticulated remains throughout the Caribbean and other regions of the world are collected through archaeological, ethnohistoric and ethnographic literature research. These examples might not be entirely the same practice as studied in this thesis, but they will, however, provide knowledge of the plethora of multistage burials resulting in dispersed and fragmented human remains. By using multiple sources, a biased view is avoided or reflected upon to provide valid data. After every description, an explanation of its particular use to this project is presented.

3.4.1. Burial practices in the Caribbean

For the Caribbean specifically, there is little ethnohistorical information, and often this is biased, written from a Catholic, western point of view and rarely from a first account. From this information, a few text passages are presented as they do provide some insight into the mortuary practice and symbolism, however limited. This account is also limited to online

resources as most libraries were closed during the period of research due to the Covid-19 virus (2020).

A literature search is performed for documentation on multistage burial practices in both the Lesser and the Greater Antilles to serve as a proxy for the practices encountered at El Carril. The burials from the different sites will be described, and the focus will be laid on those skeletal elements that were absent. Special attention is paid to the occurrence of dispersed and fragmented human bones. The sites selected again relied on having sources that were available online. The criteria the sites had to meet to be suitable to the research regarded the prevalence of secondary burial practices, burials with missing bone elements and dating to roughly the same time period as the site of El Carril.

3.4.2. Burial practices in a worldwide perspective

Archaeological, ethnohistoric and ethnographic case studies have been selected from a worldwide scale and display a variety of practices that result in the isolation of bone fragments. Taking special consideration to select cases that reflected the importance of the cranium, as this was the most prevalent element to be found in the isolated and fragmented assemblage at the site of El Carril. The information used to make a framework of different mortuary practices is meant to show a variety of practices involving both the symbolism and importance of the cranium/ long bones in different societies and the ritual that is involved with the removal of these skeletal elements. Therefore a selection of the cases might not apply as well to the case study of El Carril; however, they do build upon the knowledge of the variety of mortuary practices involving the removal of skeletal elements and the symbolic meaning of these rituals. This knowledge is essential to acquire to prevent making conclusions based on similar rituals performed in the rest of the Americas as they do not necessarily have to reflect the same practice. Therefore in this thesis, these cases are not studied in full extent and only analysed in the Caribbean context.

The ethnohistoric and ethnographic data provide a useful, but also a complicated source of information. The information, often, is written from the individuals' point of view and cannot possibly be objective. The usage of these sources, therefore, should be taken with caution. By

researching the author and knowing the context information to the motivation to study the society in question, someone can be made aware of the biases the author could harbour. For the case studies presented in Chapter five, multiple sources are used to minimalize a biased view and present an as complete account on the funerary practices in use by these societies as possible.

The results of the analyses are presented in the following two chapters. Chapter four will present the results of the osteoarchaeological analyses. Chapter five will show the results of the archaeological, ethnohistorical and ethnographic literature study.

Chapter 4: Results of the osteoarchaeological analyses

In this chapter, the results of the assessment of the material will be presented. The first subject will discuss the osteological data collected in the database, and the distribution of the fragmented bones plotted on the distribution map. The eventual presence of structured deposits will be analysed with the feature-type data (information regarding the soil type, this data is characteristically different from the usual soil and therefore marked as a feature) from the database. Following the results retrieved from the database and map, the macro traces found on the bone will be evaluated. The database and a full-size map are in the appendix. Within the chapter, a cropped version (figure 6) of the full-size map (see appendix figure 2 and 3) is included. Both were constructed with material from the NEXUS1492 project and the information I gathered in 2019 during the internship. The database and the map are individual pieces but are most meaningful when used together to reinforce hypotheses.

4. 1 Results of the osteological analyses

4.1.1 Bias towards the removal of particular skeletal elements

The data described in the database includes the find number, location (zone, sector, square and level/layer), feature number and feature description and the osteological information (i.e. identification of the skeletal element and age identification). Using the data within the database, a simple graph has been made to show the skeletal elements found in the isolated assemblage (figure 5). The isolated bone assemblage is built up of 58 pieces of dispersed and fragmented bone; 48% were cranial fragments (28 fragments), followed by 23% of long bone fragments (13 fragments); after which hand and foot bones (6 fragments in total), as well as

axial fragments (5 fragments), were both represented at 10% in the assemblage, finally, 9% (6 fragments) was unidentifiable and therefore remained indeterminate.

From this graph, drawing firm conclusions is limited. Nevertheless, there seems to be a clear bias towards cranial bones followed by long bones. These bones seem to be targeted, as is also the case at the neighbouring site of El Flaco (Weston 2017). There is no equal representation of all bone groups, and this does not necessarily indicate human interference, despite that in combination with other data (like the structured deposit and macro trace analysis), this conviction would reinforce the hypothesis.

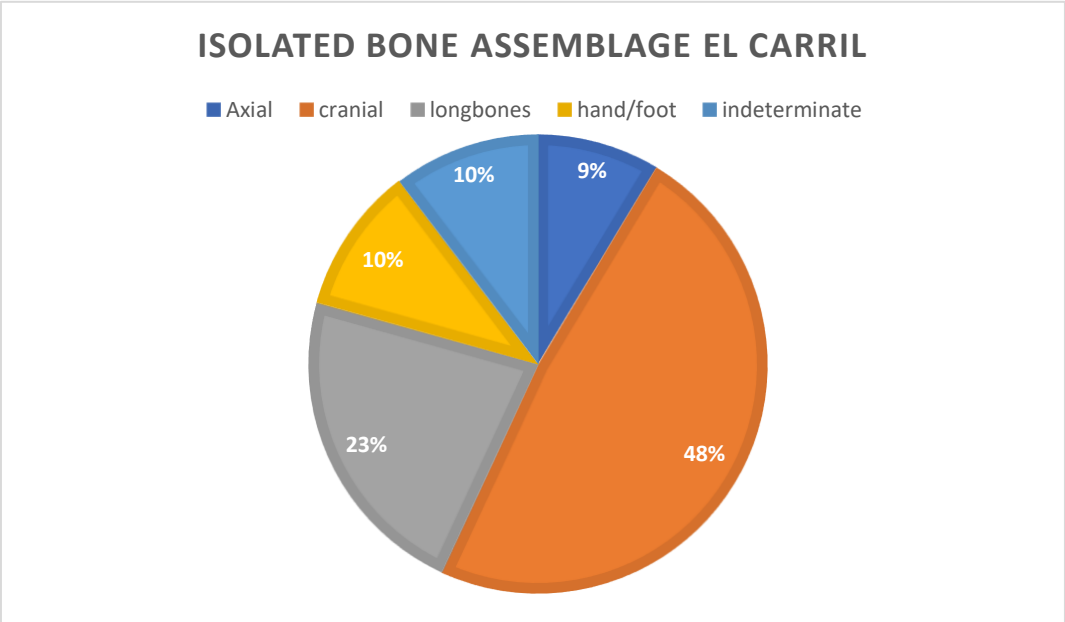

Figure 5 Pie chart showing the distribution of skeletal elements from the isolated bone assemblage at El Carril.

From the information in the database, we can discern that at El Carril, cranial and long bones were predominantly found within the dispersed and fragmented bone assemblage. According to the models on disarticulation, there are two kinds of articulations in the body, persistent and labile articulations (Booth and Madgwick 2016, 14-15; Mickleburgh and Wescott 2018, 154-158). The persistent articulations are considered joints with an important biomechanical function and therefore are more robust. The labile articulations have a less robust joint. Looking at the assemblage, most of the isolated remains (cranial fragments, proximal humerus fragments, long bone metaphases, hand/ foot bones, fibula, clavicle) come from the areas

considered labile articulations. These bones are accessible to retrieve after a few weeks of desiccation.

4.1.2 Structured deposit

The structured deposit is shortly introduced in the methodology as deposits that share a characteristic composition and location. This characteristic composition could indicate a ritual or a practice of disposing of objects that had some (ritual) significance (Bradley 2003; Bradley 2005; Redfern 2008).

To gather information on the stratigraphic context the isolated bones were found in, ideally, the soil descriptions and the artefacts found in context with that feature should be gathered in the database. However, regarding time constraints, this research is limited to the data recorded in the general NEXUS1492 database. For features only, a soil description is described in this database; therefore, the current analysis is solely based on the feature-type data described in the database.

From the available information, most of the soils the bones were buried in were either ash/ashy (42%), in a small of amount cases limestone (4%) or brown silty (8%). However, for 46%, a soil description is not available, which makes the drawing of any conclusions on the structured deposits difficult at this time.

4.1.3 Distribution of the dispersed and fragmented human remains

The distribution of the dispersed bone fragments was plotted on a distribution map. The distribution map (see figure 6 cropped for legibility purposes, for non-cropped version see appendix figure 2) is made by adapting an existing map provided by the NEXUS1492 project. The map is amassed of zones, sectors and squares, in this order subsequently becoming more precise regarding the location. These are connected to the coordinates, by using these markers, the locations of finds and units can be determined. The units are displayed in squares with the colour corresponding to the year of excavation. The isolated finds are coloured green, and burials are indicated in yellow. Sometimes burials and isolated bone finds are found in the

same trench/square; this does not automatically indicate a relation. Half green, half yellow squares document these cases. There is an option to add the DEM (elevation map, see appendix figure 3), which is in determining if there are specific locations on the levelled areas and in the mounds where most of the isolated bones were deposited.

Analysing the distribution data on the map most of the dispersed bone fragments are found in the most northern part of the excavation site (figure 6). With the DEM feature, it was assessed whether the bones were found in the mounds or the levelled areas. The data from the map with the DEM feature (see appendix figure 3) displays most of these bone fragments were deposited within the mound.

In unit 51, 52 and 54 (see map), the isolated bones do seem to be in context with multiple burials. These are the only three cases in which the dispersed bones fragments are found in proximity to the burials. Future research should be able to determine whether these bones do have a relation with the burials.

4.1.4 Final remarks on the database and the distribution map

Both the database and the map revealed to be useful resources, especially when used together. With further data added to the database regarding soil descriptions and artefacts found in connection with the dispersed bone fragments, a better understanding of the presence of structured deposits can be made. Furthermore, data on the burials and their location concerning the dispersed bone fragments will clarify if any connections between them exist. This will also aid in understanding the actor that has operated on these dispersed fragments.

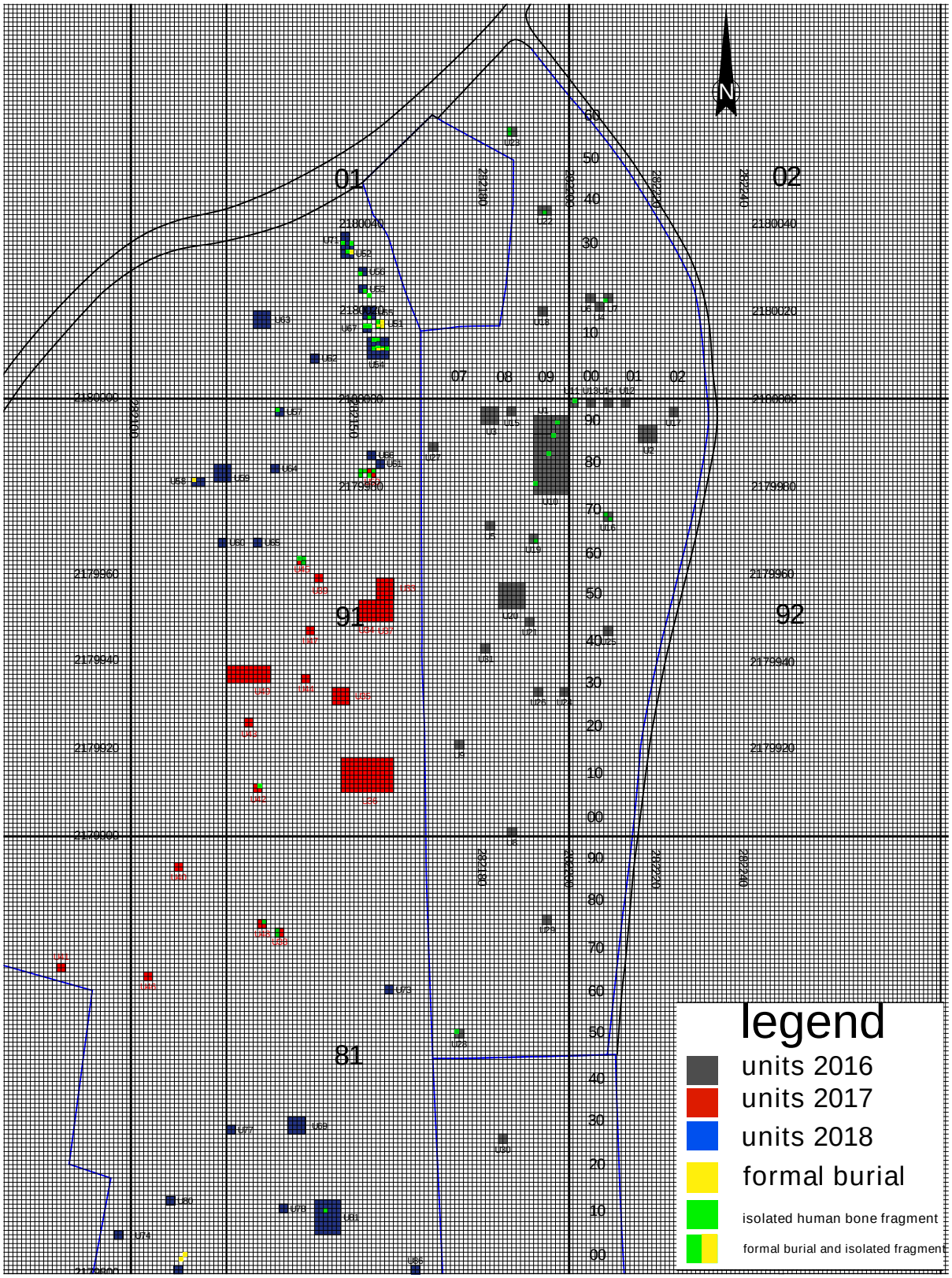

Figure 6 Cropped copy of the digital distribution map of the dispersed and fragmented bones at El Carril without DEM (focus on the northern part of the excavation).

4.2 Macro trace analysis

In this paragraph, the results of the macro trace analysis on the dispersed bone assemblage of the site of El Carril will be presented. From all the fragmented bones found, only a small sample was photographed using a professional camera. Other photographs are photographed by myself using a mobile phone camera. The current assessment will only concentrate on the artefacts that were professionally photographed and therefore, will only present a sample of the total amount of dispersed and fragmented remains. Occasionally, the professional photographs are combined with the mobile phone photographs to provide another angle if needed. The results so far, are limited as to the actual alterations on these bones. Nevertheless, these preliminary results provide insight into the possible factors that have acted upon the bones leaving macro markers. Further research will then be able to build upon these findings. Due to the size of the analysed sample the full description of all bone fragments can be found in the appendix. The following paragraphs present the results from these analyses.

The predominate weathering stage observed from the sample assemblage is W1. Behrensmeyer (1978, 151) describes this stage as cracking along the fibre of the bone, and residual skin and fat covering might be present or not. The time a bone needs to get to this stage depends on local environmental factors, even though there are some broad patterns observed. Generally, stage one takes about 0 to three years (Behrensmeyer 1978, 157). So, the bones from the El Carril were probably not exposed for a period longer than three years after which they were covered up. Determining the weathering stage was not possible for all fragments because many of the fragments have a calcareous concretion on the surface of the fragments inhibiting the study of the cortical bone. Physical study or possibly a cleaning substance specialized to clean the concretion from the surface will provide an opportunity to further study on the weathering state of the bones in the future.

Solar bleaching was not as prevalent, again, studying this phenomenon was made more difficult due to the concretions on the surface of the bones. There were two find numbers with cranial bones that did display some whiter areas which could indicate solar bleaching on some of the bones: F668 (figure 7) and F909 (figure 8).

Figure 7 Fragments of F668, ectocranial surface. The red arrows indicate potential cutmarks and the blue circles indicate lighter bone, possibly due to UV radiation (photograph courtesy of NEXUS1492).

Figure 8 Endocranial surface of fragments of F909 (photograph NEXUS1492, taken by the author).

Most of the bones displayed a smooth fracture edge. Further examination of the fracture edge could help indicate if the bone was deposited already fractured or if the fracture happened during the excavation. This information will then be able to shed light on the state in which the bone was deposited; as a whole or in an already fractured state.

Regarding cutmarks, canid chewing marks and other features considered interesting when looking for evidence of human manipulation; the assemblage offers many examples that require more research. Most of the samples display a degree of straight linear cuts with varying depth (see red arrows figure 6, 10 and appendix figures 4 and 5,8,9,10,11,12,14,16). These cuts are not consistent with the markings made by root etching which is also present on a large sample of the assemblage. Further research with a microscope or SEM imaging is expected to help to determine the nature of these cuts and if they are possibly made by human manipulation, in the process of excarnation, or if they were made due to other natural or physical processes. There was no evidence found in the sample for canid chewing marks.

Other observations on the macro markings on these bones pertain to irregular staining on the external surface of the bone (figure 9). The origin of these stains might lie in a myriad of options some of them being: staining as a result of minerals in the soil (Pokines *et al.* 2013, 330-355; Pollock *et al.* 2018); staining due to of retention of grease during the process of desiccation (Pokines *et al.* 2013, 330-355); or stains as a result of dying with ochre. Further research on the bones will be required to determine the cause of these stains.

Figure 9 Bone fragments of F1315, the blue box is around a patch of irregular discolouration (photograph courtesy of NEXUS1492 project)

Between the fragments of F3638, one fully blackened piece stands out from the assemblage. It is remarkable as the bones in the same context do not display the same blackened surface. The cause of the staining could be oxide staining from the soil. However, this would mean the bone was not initially deposited with the other bones from this context as they do not display blackened staining. Another option would be that the bone was exposed to fire and soot-covered the surface. This should be determined by further research. This bone is unique within the sample assemblage.

Figure 10 Bone fragments of F3638 (photograph courtesy of NEXUS149)

The macro markings observed on the sample assemblage of El Carril are not straight forward. The findings do not provide a conclusive yes or no to the question if humans were the actors that caused these marks. They do provide an opportunity to perform more detailed research to retrace what happened to these bones. The next chapter will look at the results of the literature research to provide insights into the cultural context and related funerary practices related to the removal of skeletal elements from burial and the dispersion of human bone fragments.

Chapter 5: Results of the archaeological, ethnohistoric and ethnographic literature research

In this chapter case studies from archaeological, ethnohistoric and ethnographic sources are presented. These case studies all involve the practice of the removal and displacement of skeletal remains as part of a mortuary ritual. First, the archaeological case studies within the Caribbean will be presented. After initial exploration of the practice within the Caribbean of the removal of skeletal remains, ethnohistoric observations from the Caribbean of this practice will be discussed. In the next paragraph, the phenomenon of the removal of skeletal remains will be looked at from a global archaeological scale. Subsequently, some global ethnographic accounts will be discussed. Drawing from all these different examples, a general profile is made. This profile will provide some common characteristics of the mortuary practice of the removal and displacement of skeletal elements from a burial context.

5.1. Archaeological case studies from the Caribbean islands

5.1.1 Anse à la Gourde, Guadeloupe

The site of Anse à la Gourde is located on the island Guadeloupe in the Lesser Antilles and is dated to AD 500-1450. The burials of interest for this study date to between A.D. 1100 and1400 (Hofman *et al.* 2000). The burials show a great variety of funerary practices, including primary (54), primary partially disturbed (14) and secondary burials (7). There seems to be a bias in the burial account as only 11 infants/ children were found out of a total of 83 inhumations of 100 individuals (Hoogland and Hofman 2013). This might imply differential treatment of deceased

children. Most of the burials were found close to the habitation level within the habitation area. The majority of the individuals are buried in a flexed position (Hofman *et al.* 2018, 457; Hoogland 1997, 8; Hoogland 1998; Hoogland 1999).

Some burials bear characteristics of being left open to desiccate after which skeletal elements were removed. These skeletal elements were often long bones and the cranium. This practice had a bias for male individuals. Some of the removed human bone could be found again in other graves or secondary deposits, for example, a cranium was found buried in a secondary deposit (personal communication dr. Menno Hoogland, 2020). There is also evidence that individuals were wrapped in organic material and dried over a fire (Hofman *et al.* 2018, 457; Hoogland 1997, 8; Hoogland 1998; Hoogland 1999). An additional remarkable feature of burials at Anse à la Gourde are the burials with ceramics that were placed on the individuals face. These have only been found on three individuals; an adult woman and male and one child (Hofman *et al.* 2018, 457; Hoogland 1997, 12; Hoogland *et al.* 2010).

Looking at the funerary practices from Anse à la Gourde, it is clear the removal of human bone is not an exceptional practice. There is a strong inclination towards the importance of the cranium. This is reflected in the removal of the cranium and the covering of the cranium with ceramics. The meaning of this practice is not yet clear, but it does closely resemble the situation encountered at the site of El Carril.

5.1.2 Kelbey's Ridge 2, Saba

The site of Kelbey's Ridge 2 is situated on the north-east area of Saba. The site is dated to cal. A.D 1350-1450. At Kelbey's Ridge 2, seven burials were found containing a total of 10 individuals. All of these burials were located within the habitation area. The burials were all associated with house plans. Two of the houses were later used at a cooking hut with hearth features. The most common burial position of the buried individuals was seated in a flexed position (Hoogland and Hofman 1993, 170; Hofman *et al.* 2018, 460).

The burials found at Kelbey's Ridge 2 can be categorized into either being a single burial, a composite burial or a secondary burial. The burial category of single internment contained four

individuals: one female adult, two adolescents (12-18) and an infant (0-3). The inhumation of the infant did not contain the right humerus, suspecting this skeletal element was removed intentionally. This conviction is based on account of the good preservation of the rest of the burial. Furthermore, the burials of the adolescents both missed the cranium. Of one of these burials, the torso was disarticulated, suggesting disruption (Hoogland and Hofman 1993, 170; Hoogland 1996; Hofman *et al.* 2018, 460). Some of the inhumated individuals were missing the cranium (Hoogland and Hofman 1993, 170; Hofman *et al.* 2018, 460).

Two composite burials were encountered, an adult female with an infant and an adult male with the fragmented remains of two children. In the first case, the burial of the infant was included later to the burial of the adult female. This was evidenced by the disruption of the region around the infant. In the second case, the burial of the male with the cremated bones of two children is suspected of happening in at least five stages. One of the children aged 6 to 7 years old was inhumed first; this grave was kept open. After some time, all the long bones and the cranium were removed. The body of the child was already skeletonized by the time the bones were taken and cremated, indicated by the absence of traverse fractures on the cremated bone, which would have been present had the bone been cremated in a green/ fresh state (close to the time of death, not yet petrified/ fossilized) (Hoogland and Hofman 1993, 171-170; Hofman *et al.* 2018, 460). The cremated bones were added to parts of the cremated neurocranium of a child of 3 years old. This assemblage of the cremated bones of the two children was finally added into the burial of the mummified adult male. The bones of the cremated infant match the bones that were taken from the internment. The femur of the adult male was removed probably at that same time, and the burial was then closed up. The femur is suggested to have been removed for ritual reasons (Hoogland and Hofman 1993, 170; Hofman *et al.* 2018, 460).

As is made clear from the previous paragraphs, the burial traditions at the site of Kelbey's Ridge 2 are complex. There is evidence for habitual use of fire to preserve the body; indication for the removal of skeletal elements after skeletonization (either in the open air, with use of fire or in closed internment); and multistage funerary practices. Unlike at Anse à la Gourde, there is no age bias in burial treatment at Kelbey's Ridge 2 (Keegan and Hofman 2017, 229).

5.1.3 Monserrate, Puerto Rico

The site of Monserrate is located at the north-eastern coast of Puerto Rico, and nowadays the area is called Luquillo Beach. The site is dated to the post-Saladoid period on the grounds of the ceramic style present (Roe *et al.* 1990, 343). At the site, a total of 63 burials were found separated up between two mounds. One mound contained 44 burials, and the other contained 19 burials. The majority of the burials were determined to be adult, only 14 of the total number of burials were children. Several of the burials appeared to have been buried directly within the house refuse. There were two cases of composite burials, one with six adults and one of an adult female together with the cremated remains of an infant (Roe *et al.* 1990, 344; Curet and Oliver 1998, 224). The condition of most of the skeletons was relatively poor and in an advanced state of deterioration (Roe *et al.* 1990, 345-349).

Twenty-four of the internments were associated with artefacts. These artefacts were most often ceramic cooking pots which would have contained food offerings according to the authors (Roe *et al.* 1990, 344). The ceramics were of the Monserratean style, which is a subseries of Ostionoid pottery which is roughly dated between A.D. 600-1100 (Roe *et al.* 1990, 345-349; 363).

Most burials were complete, and most individuals were buried in a flexed position, two burials missed the cranium(Roe *et al.* 1990, 349; Curet and Oliver 1998, 224). One of the excavated individuals was an adolescent of which the sex is unknown. The cranium of this individual was not present, the right mandible was. Another inhumation found consisted only of a cranium, but it was hypothesized that the rest of the skeleton would lie not far beyond. This conclusion was drawn based on the presence of the cervical vertebrae. The cranium belonged to an adult male (Roe *et al.* 1990, 350-351). Again prevalent here is the practice of the removal of the cranium.

5.1.4 Tibes, Puerto Rico

The site of Tibes is an inland site in the south of Puerto Rico in the Ponce region (Crespo-Torres 2010, 191). The site is complex in its layout with 11 stone-lined precincts. Equivalent

complexity is only observed at later Chicoid sites. With this reasoning, Tibes is seen as one of the first chiefdom sites in the Caribbean. The site has Saladoid deposits as well as Ostionoid deposits, making this site important for the study of development through these cultural changes (Curet and OIiver 1998, 225).

Excavation at the site of Tibes was performed between 1975 and 1982. Tibes had an abundance of burials; nevertheless, these were not the focal point of the excavation. Again, this excavation mostly provided information for the devising of a chronology. Therefore, the information on the burials is scarce. Only the general provenience of the inhumation is known; the Saladoid burials were clustered, and the Ostionoid burials were associated with the house and the refuse middens. Most clustered burial areas were found to be repurposed in the later Ostionoid period, frequently built upon as public gathering facility. This practice has also been observed at the close by sites of Maisabel, El Bronche, Punta Candelero and Playa Blanca 5 (Curet and Oliver 1998, 225-226). With this lack of information, it is hard to conclude funerary practices for this group of burials (Crespo-Torres 2010, 193).

Edwin Crespo-Torres looked at the stored remains of the excavation and determined a total of 126 individuals: 31 adult females, 25 adult males, 62 adults of which sex could not be determined, and eight sub-adults (Crespo-Torres 2010, 194-195). Again, an age bias can be observed. From these, Crespo-Torres only identified one case where the cranium was removed and redeposited under the thoracic cavity (Crespo-Torres 2010, 26). A notable practice observed at the site of Tibes is the cranial modification of male crania. The frontal occipital area was flattened. The practice is only observed for three individuals' due to the bad preservational state of the bones. Cranial modification is also observed on other archaeological sites on Puerto Rico: Punta Candelero, Paso del Indio and Maisabel (Crespo-Torres 2010, 198; 204; Fewkes 1903, 457) and at other location within the Caribbean like Anse á la Gourde, Kelbey's Ridge 2 and El Flaco amongst others (Duijvenbode 2017; Weston 2017, 30).

Judging from the examples given in the paragraphs above, there is a clear trend discernible. Burial in the Late Ceramic Age was predominantly done in the area associated with the home. There is a wide variety in the way people interred their dead and in some instances, this involved a prolonged engagement with the dead by preforming secondary burial rituals. In

other cases, burials were interred and received further consideration. The information that can be extracted from these examples; however is that the removal of skeletal remains from burials was not merely an occasional practice, but can be systemically observed throughout the different islands within the Caribbean.

As can be gathered from the previous paragraphs, the cranium plays an integral part in the symbolic representation. The cranium is often selected to be removed from the burial contexts to be redeposited in another location. Another prevalent practice is the modification of the crania. From the abundance of data relating to the modification and the artificial removal of the cranium, evident importance towards this skeletal element is signified. A less prevalent practice is the removal of long bones, which is only described at the sites of Anse á la Gourde and Kelbey's Ridge 2.

5.2 Ethnohistoric information on the Caribbean

Due to a lack of indigenous written sources, researchers often rely on historical sources written by European colonizers after 1492 to find additional information on the motives behind certain practices. These sources, however, are highly biased and perceived from a 'western' point of view and often are not written from a first account experience. Moreover, these reports were not made in appreciation of the culture of the indigenous peoples inhabiting the Caribbean islands; instead, they were made/written/documented/reported to provide information to the people in the European countries. This tradition of relying on these highly biased accounts on the indigenous cultures neglects actual indigenous traditions (Hofman *et al.* 2018, 202; Ensor 2013, 84-85). However, not disregarding their informative nature of being the only description we have of these societies, the next paragraphs present some text passages that are of interest. These passages relate to the cultural practices of the removing of skeletal elements of a deceased person.

On his first voyage, Columbus visits a village in Cuba where he discovers human crania in a basket hanging from the rafters of the house. He interprets this to be the head of the builder of the house or maybe the head of a deceased family member. His suspicions could not be

confirmed nor denied by the inhabitants of the village as they had fled their village (Colombo *et al.* 1969, 84).

On his second voyage, in November 1493, Columbus landed on the island of Guadeloupe. He ventured into a village close to the beach, the inhabitants of the villages had fled, leaving their belongings. Columbus enters one of the houses and recovers some items from it, including several human long bones. After collecting these, he concludes this village must have belonged to the Carib people, which he believed to be cannibals (Colombo *et al.* 1969, 133).

Another passage was written by Ferdinand Columbus, Cristopher Columbus' son. He describes a burial of the Cacique (chief). The body is cut open and dried with the help of a fire. Ferdinand Columbus also reports that for several of the burials, the heads (cranium) were taken (Colombo *et al.* 1969, 193).

In our case, these three passages are of interest as they involve the removal of skeletal elements of an individual and keeping them in a household context. The third text passage mentions the use of fire to dry a body after death to speed up desiccation and the keeping of the crania of individuals. Both these situations are possible explanations of the funerary practices and disarticulated bone encountered at the site of El Carril, as these conditions were also observed by Weston for the site of El Flaco (Weston 2017, 6, Hofman *et al.* 2018, 211).

An example of the significance of bones for fertility can be identified in a 16th-century account written up by Fray Ramon Pané from the indigenous societies of the island of Hispaniola (present-day Haiti and the Dominican Republic). The account relates to the origin of the ocean. The father, Yaya, killed his son, Yayael. Yayael desired to murder his father, Yaya while Yaya wanted to prevent his death and therefore killed Yayael. He kept the bones of his son in a gourd hung from the rafters of his hut. One day, he decided to inspect the remains of his son and discovered there were fish in the gourd. Yaya and his wife decided to eat these fish. At a particular moment, the gourd was not hung securely from the rafters and fell to the ground. The story recounts that a substantial amount of water flowed from the gourd. So much that it filled the seas (Arrom 1999, 13-14). In this story, the bones of the son of Yaya seem to

represent fertility as they provide the family with food and eventually with the sea, which essentially is an inexhaustible source.

This account is of interest for this research as it presents an ontological explanation to the practice of keeping skeletal remains from the deceased. In this case, the bones seem to represent the sea and the bountifulness of the sea. Therefore, they might be regarded as a symbol of fertility. This ties in with previous observations made with the bone fragments being interred in (agricultural) mounds and the bones being interred in burned layers of refuse to fertilize the soil.

5.3 Archaeological case studies from a global perspective

In this section, the focus is placed on archaeological, ethnohistorical and ethnographic information regarding dispersed human remains in the context of funerary practices from across the globe. These sources display indigenous societies that practice elaborate multistage burial rituals where human skeletal elements are removed from the burial and displaced to another location after desiccation of the weak parts. The examples presented in this section are expected to offer novel insights into the motives behind the removal of skeletal elements of deceased individuals and to preserve these in a specific way. It is expected that such insights might indicate specific patterns regarding the kind of bone that is being removed and displaced; specific locations where such bones are displaced and preserved; and the treatment these bones receive after their removal. These kinds of patterns can then be used in comparison with the sample of dispersed bones at El Carril to infer if a cultural phenomenon rather than a natural phenomenon is implicated.

The examples that are used vary greatly in nature, for example, some case studies reflect headhunting and other case studies reflect that the dispersed bones are the result of a practice related to the belief that they represent fertility and virility. The selected examples focus on the removal and the displacement of the cranium, which is a prevalent aspect at the site of El Carril as well.

5.3.1 'Cranium cult' in the Middle East

Through the centuries the inhabitants of the Middle Eastern region went through immense changes. The Hunter-Gather societies increasingly became more sedentary and started to rely more upon agriculturally acquired foodstuffs. With this change, the people started to build more permanent architecture. (Croucher, 2018, 105; Goren *et al.* 2001, 671; Verhoeven 2002, 248). This period shows a rich record of burial variety, not only between sites but also within the site. A widespread habit prevalent in the Levant and Anatolia is the removal of the crania, rarely the full cranium, from the skeleton. This practice can be observed from the Pre-pottery Neolithic A and B in the Levant and the Pottery Neolithic in Anatolia (Belfer-Cohen 1988, 300; 305; Croucher 2018, 106; Goren *et al.* 2001, 671).

The removal of the cranium is thought to have occurred after the skeleton had skeletonized, making it easier to remove the cranium (Belfer-Cohen 1988, 300; Croucher 2018, 106; Goren *et al.* 2001, 671). Some of the crania retrieved were the viscerocranium was covered with a layer of plaster. This layer formed an abstract representation of a human face (Bonogofsky 2001, 142-143; Croucher 2018, 107; Goren *et al.* 2001, 686). The neurocranium was not covered with plaster, and it is theorized these were covered by wigs made of perishable materials that would not survive as long as bone material. This hypothesis is based on a set of plastered crania found with the residue of keratin on the neurocranium (Croucher 2018, 110). These crania showed signs of being handled; the plaster was removed and restored as the crania were being utilized (Kuijt 2008, 171-183; Bonogofsky 2001). These crania were often buried in caches underneath plastered floors within the house or in courtyards (Croucher 2018, 106).

Throughout the years, several explanations were given for this phenomenon. The initial response researchers gave to the plastered crania was that they were connected to ancestor veneration (Croucher 2018, 104; 115; Verhoeven 2001, 249). Recently, more researchers tend to renounce this explanation and offer alternatives to the ancestor veneration. Ian Kuijt (2008) proposes that the habit of cranium removal was not only a way of honouring the dead and remembering them but also establish a cultural system. This cultural system was used to establish social cohesion. He supports this theory on the fact that the crania were being

handled and showed signs of renewal. He alleges once the ancestral cranium is given to someone else, outside of the immediate family, the personal ties to that cranium ceases. Now the cranium is in circulation and symbolizes a shared past (Kuijt 2008, 171-183). Nevertheless, another author, Katharina Croucher (2018), proposes the use of modern theories on mourning. This theory is similar to ancestor veneration and proposes the continuing of bonds. Instead of detaching from deceased after death, as Freud proposes, an object is kept to recollect that person by. Thus, Croucher proposes the crania were kept to remember their deceased (Croucher 2018, 103-120). In addition, Marc Verhoeven (2002), proposes the idea of ancestor veneration is a feeble explanation. He suggests ancestor veneration is not a sufficient explanation as the crania also belonged to children; this age group would not fit into the traditional criteria of ancestor veneration. He also remarks on the crania that were plastered, were remarkably shaped. He proposes they have been selected for their shape and might have been subject to cranium modification during development. Taking this in account and looking at various ethnographic examples he proposes the crania might have symbolized fertility, vitality and life-force. He also sees ties with the headless statues discovered in this region, he hypothesised by removing the head off of the statues that they were ritually dismantled, this is also noted in the article by Goren *et al.* (2001, 672). Further strengthening his claim that the head played a part in symbolic life (Verhoeven 2002, 249-252)

5.3.2 Funerary practices in European context

Burial treatment in Europe is not so easily put into categories. Through the decades, Europe has been inhabited by many different cultures, inevitably having different mortuary rituals. All these cultures had their funerary rituals and funerary practices. There is not one cohesive burial habit or an encompassing culture to practice a form of selective redeposit. The paragraphs will present some archaeological case studies of isolated bones found throughout Europe together with an interpretation.

The Magdalenian period in Europe produced some evidence of engraved human bone material (Bello *et al.* 2017, 1-3). After looking at the bones for micro- and macro-markings, the bones seemed to have gone through an extensive process. After the death of a person, they would butcher and filet the cadaver. The bones would be engraved, and after the engraving was

made, the bone would be broken to extract the marrow. The sequence of this process emphasizes the engraving prior to the extraction of the marrow. This would imply the importance of engraving and might even signify ritualistic cannibalism (Bello *et al.* 2017, 13-14).

At the site of Raffin in Britain, a fragment of a human cranium was found underneath a phallic stone monument. This Iron Age monument was hypothesised to represent fertility and virility. The monument dates back further than the fragment. The fragment had macro traces of being handled repeatedly, and the surface was worn smooth (Armit 2012, 71). To put this site into context, Raffin was not the only location in Britain where the human cranium has been found in isolation. At the Iron Age sites of Danebury and Suddenfarm, there is evidence that the cranium was removed after a period of desiccation in the open air (Booth and Madgwick 2016, 14-23).

Another location noteworthy is the King's Stables in County Armagh in Northern Ireland, here only the viscerocranium (facial bones) of a human cranium was found. The viscerocranium seemed to have been trimmed from the full cranium. Furthermore, the bones also indicated repeated handling. This was especially remarkable as the animal bones originating from the same context did not seem to show the same macro markers as the human bones. Taking this into account, the archaeologists interpreted this context to be a ritual deposit (Armit 2012, 72, Lynn *et al.* 1977, 55). There is a lack of further research into the nature of the phenomenon.

In the Bronze Age, up until the Late Iron Age, the Celtic culture in Rhône valley in France also expressed importance towards the human head in their art and ontology. At many Bronze age and Iron age sites, isolated crania have been discovered. There was no bias regarding sex or age. The crania of children as well as the crania of adults were removed (Armit 2012, 81-83). Theories for their fascination for the cephalic extremity go from ancestor veneration to trophies from headhunting (Amit 2012, 73-83).

Another case study can be found in Europe is the dispersion of human remains due to violent attacks where the family was not able to provide a proper burial. Evidence of this phenomenon can be found at sites dating back to the Michielsbrerg and Muzingen cultures. Even though

these cultures were perceived to be peaceful, recent evidence points out their violent nature (Lefranc *et al.* 2018, 92-101). At sites dating back to these periods, burials of only parts of humans were found. Most of these finds comprise the cephalic extremity, the first few cervical vertebrae and the cranium and mandible. This is consistent with beheading (Lefranc *et al.* 2018, 99).

A remarkable example is the cranium nests of Ofnet in Germany (Lefranc *et al.* 2018,101; Frayer and Martin 1997). The crania are buried in shallow pits and have the first cervical vertebrae attached. Some even have traces of ochre on them (Frayer and Martin 1997, 184). The crania have no signs they were butchered, and it is hypothesised they were buried shortly after retrieval. Again, here there is no bias towards sex and age, making interpreting the reason these crania were deposited here hard. Were they killed in an attack? Is this part of a ritual (Frayer and Martin 1997, 211)?

Frank van der Spelde (2016) describes in his master's thesis the case study of a Merovingian settlement in Oegstgeest, South-Holland, The Netherlands. At this site, most formal burials were encountered in a centralized cemetery. Three burials did not fit these criteria and therefore, were not excavated in the same manner as the formal burials as they were not recognized as being such. Additionally, throughout the site, human bone fragments were identified. These fragments predominately belonged to either the cranium or long bones. These remains were removed from a burial context and were deposited in pits. One example contained five long bones positioned in a five-pointed star. Another example of a typical deposit was a pit containing remains from several individuals (Van der Spelde 2016, 11-12). It is hypothesized that this dispersed and fragmented bone assemblage is a consequence of sub-aerial exposure and are interpreted as possibly a votive pagan cult (Van der Spelde 2016, 117-147).

Again as can be read from the previous examples, the cranium has a significant symbolic meaning for these societies across the globe. The cranium stands for fertility or plays an instrumental part in the veneration of ancestors. In the Middle Eastern regions, it is even interpreted as a symbolic marker of a unified culture.

5.4 Ethnographic and ethnohistoric information

5.4.1 Naga culture group in South-East Asia

The Naga are a culture group comprised of multiple subgroups. They do not have a uniform practise of religion and consequently funerary practices. They do, however, have the same ontology (Hutton 1965, 30; Kanungo 2011, 83-87; King 1887, 100).

They know a great diversity of burial practices. Every tribe has its approach in disposing of the dead. However, this wide variety of funerary practices also diminished with the advance of monotheistic religions disproving of the 'pagan' rituals involved in parting with the deceased. The Naga are most renowned for their habit of headhunting, although this practice soon diminished when headhunting became outlawed and many tribes' men and women converted to monotheistic religions (Kanungo 2011, 91; Woods 2012, 90).

The burial practices of the Naga people vary significantly amongst the many tribes. A general theme, however, is that death provides fertility to the lands as the spirit of the dead would inhabit the lands and provide power to it to produce food (Hutton 1965, 32). To transfer the soul of the deceased onto the land every tribe practices different rituals. Some bury their dead on platforms along the roads towards the village and let the diseased desiccate there (Kanungo 2011, 77-98). Other tribes place the deceased in an open grave in front of the house (Hutton 1965, 30-32; 87, 100). Again other tribes retrieve the cranium and keep it within the house or another spiritual place and preform regular rituals (Kanungo 2011, 88-97) while others keep the whole skeleton or select a few bones to be maintained and used in rituals (Kanungo 2011, 88-97; Hutton 1965, 29-32). Most of the Naga tribes thus practice different burial treatment, but they mostly all preserve body parts and practice multistage burial rituals.

Headhunting amongst the Naga was firmly embedded in the ontology of this culture group. The cranium represented power, and the Naga believed the soul of the person the head belonged to could be trapped within and be employed to keep the house and the village safe (Woods 2012, 81; 99). Headhunting became a status symbol, the more heads someone amounted, the higher the status was and the more desirable that someone was for marriage

(Woods 2012, 97). These crania required rituals to be performed periodically. These rituals were to be adequately performed; otherwise, the spirits inhabiting the crania could wreak havoc for the owner and his family (Woods 2012, 101). This meant that having crania as a result of headhunting required wealth, or rather enough surplus in produce to facilitate the offerings (Woods 2012, 106). As headhunting diminished, the majority of the people did not want to put effort into the required upkeep rituals. This caused many of these crania to be destroyed and deposited in the forests (Woods 2012, 100).

The habits displayed by this varied and rich culture group could shed more light on the particular case we work with at the site of El Carril. They provide possibilities for the fragments discovered at this site to be part of a cultural practice or a religious practice and could expand our understanding of the symbolism around the cranium and the body.

5.4.2 Solomon Islands in Oceania

New Georgia is situated in the Western province of the Solomon Islands. Most sources come from early ethnographers, so they might provide a biased image of the reality and exaggerate certain aspects to prove the barbarity of the tribes in this region.

The indigenous tribes of the Solomon Islands also practice headhunting comparable to the Naga and also have comparable burial practices involving the removal of the cranium (Wall and Kuschel 1975, 62; Walter *et al.* 2004, 143; Woodford 1890, 142-157). Charles Morris Woodford describes in his logbook, he kept during his visitations of these islands, that all the inhabitants of the Solomon Islands practice headhunting, but certain regions are more active than others (1890, 153). They believed whenever a special occasion occurs an offering of hunted heads was required to bless the occasion (Woodford 1890, 154). The crania could be acquired through raiding other villages (Wall and Kuschel 1975, 62; Woodford 1890, 152) or by killing slaves (Woodford 1890, 154-156). The offering required a head from both sexes. There were no requirements for age (Woodford 1890, 155). Generally, they were stored in the canoe house, where they were hung from the rafters with other slaughtered life stock (Wall and Kuschel 1975, 62; Woodford 1890, 152). This creates a distinct archaeological pattern of crania accumulated in a building, often near open water sources and accompanied by refuse from

animal slaughtering. Alternatively, crania were buried in mass graves (Wall and Kuschel 1975, 62).

Not only the heads of the rivalling tribes were essential for these people, but also their own heads (Hocart 1922, 80-103, Wall and Kuschel 1975, 57-60; Walter *et al.* 2004, 150; Woodford 1890, 37-39). The burial of the chiefs and the head-hunters was performed differently from the burials for children and women (Hocart 1922, 85-86). However, both kinds of burials required the crania to be removed (Wall and Kuschel 1975, 59).

To retrieve the head of the dead, they left the dead in the woods for approximately 14 days. This practice was called *hiding*. During this period the body would be left to desiccate. After this period, an allocated person would retrieve the cranium from the decaying body. It would be cleaned and left in the sun to bleach (Hocart 1922, 82; 90; Wall and Kuschel 1975, 59; Woodford 1890, 37). After a period of bleaching, the cranium could be deposited at a location depending on the sex and the status of the person. The crania of the chiefs and head-hunters could be stored at a particular ceremonial shrine in a specially made cranium house. They were accompanied by the shell rings that trapped their evil spirit. The shell rings were strapped to the cranium and represented a body. These crania generally became a part of ancestor veneration shrines and could perform blessings when offers were made to them (Hocart 1922, 103; Wall and Kuschel 1975, 59-60; Walter *et al.* 2004, 150-152). The crania of women and children were generally put back with the body. If the husband was devoted to his wife, he also had the option to keep her cranium in a wicker basket hung on the eaves of his hut (Wall and Kuschel 1975, 61).

5.5. General profile based on the archaeological, ethnohistorical and ethnographic literature research

As observed in this chapter, the practice of the removal of skeletal elements is not incidental. Instead, the practice can be observed throughout the world and throughout different periods. The cases presented in this chapter are only a sample of a more widespread and varied practice. The case studies provided a general understanding of the practice as well as some common characteristics. These characteristics are varied burial practices involving the removal

of bones; often certain bone groups are targeted as they hold symbolic significance; most subjects to this practice receive a particular treatment afore the removal of skeletal remains (e.g. open-air desiccation, excarnation by means of removing the flesh manually); the deposit of these elements often are characteristic and can be identified by the soil type and additional artefacts found in context.

The case studies in this chapter were intended to analyse the extent of burial practices resulting in dispersed human remains. In the previous paragraphs, only the dispersed bone fragments were considered in the analysis. Many of the case studies presented involve the practice of headhunting. Headhunting, often, was not only an expression of power but often within these societies, the crania held some significance symbolically. This practice is not represented at the site of El Carril, and also not reported in the late 15th- early 16th-century ethnohistoric accounts on the island of Hispaniola. Therefore these case studies apply less to the site of El Carril, despite that, aspects of the practice do inform about the symbolism the cranium possessed in different societies. Therefore these cases were still described as they inform on the ontological reasons to remove a bone from its context.

Moreover, societies involved with headhunting also practised the removal of bones of their deceased precisely because of the same ontological beliefs. This can be observed for the societies of the Naga, the tribes of the Solomon Islands and possibly the 'skull-nest' of Ofnet. A more likely situation for the site of El Carril, however, is the case study where the practice of the removal of skeletal elements is motivated by themes like fertility, virility and life-force as also described for the cases in Europe, the Middle East and in mythological stories from the Caribbean.

In the previous case studies of different incidents of burial treatment involving the removal of skeletal elements in a broader regional Caribbean context and around the world were described. These cases all share several commonalities that can be put into a general profile which could help to identify burial rituals of the same kind. This general profile could also provide more insight into the motives of the practice of removal of bones. However, this profile is not meant to draw definitive conclusions on the regular removal of skeletal elements as a

burial treatment. Instead, it is considered a starting point to orient on possible agents and rituals that were involved in such practices.

The Caribbean and worldwide case studies display the following set of commonalities:

- Often the removal of skeletal elements is not the only burial practice at the site. Most commonly, there is a myriad of ways people disposed of their deceased that did not necessarily have to involve the removal of skeletal elements.
- To facilitate the removal of skeletal elements as part of a ritual, the body was often left in the open air, or near a fire to desiccate/ mummify. Excarnation by removing the flesh with a knife is also observed, however more sparsely than open-air or fire aided desiccation. This practice is more prevalent in Europe and Asia.
- The cranium and long bones were predominantly targeted, with the cranium often representing the spirit of an individual, fertility, virility, vitality and life-force.
- The remains that were removed were kept in particular places and received specific treatment. Often the deposit of these elements are characteristic and could be considered as a structured deposit.

The next chapter will present the discussion. Here the results from Chapter four and the current chapter will be discussed in the framework of the questions proposed in the introduction.

Chapter 6: Discussion

This thesis aimed to gain a better understanding of dispersed and fragmented bone assemblages as part of a funerary ritual at the site of El Carril in the northern Dominican Republic. The main research question was *What agents contribute to the distribution of fragmented human bones at the site of El Carril, northern Dominican Republic, and how can this be understood in a cultural context?* The analysis of distribution patterns, the contexts of the deposits, the skeletal element bias, and macro traces were employed to answer this question. Additionally, this thesis has studied cases of burial practices resulting in dispersed bone fragment assemblages in the context of the Caribbean and on a global scale. The results of the combined osteoarchaeological, archaeological, ethnohistorical and ethnographic research does display characteristics of a burial ritual in which bones are removed and displaced and where a human agent is involved. However, more research is necessary to strengthen this conclusion.

6.1 Reflecting on the results

The results from the analysis of the dispersed and fragmented human remains found at the site of El Carril showed a clear bias toward cranial fragments followed by long bones. The bones bore some marks of subaerial exposure with evidence of weathering due to open-air desiccation and solar bleaching. Deep cuts possibly made by stone or shell tools were also identified. These fragments most often were found in ashy soils and within the mounds. The mounds were thought to have been used as refuse heaps, cooking areas, formal burial grounds as well as a kitchen garden. The burnt layers display an effort to fertilize the soil to facilitate cultivation. The bones could have served the purpose of symbolically fertilizing the soil.

The results show that there are some clear patterns to be discerned. As reported for the site of El Carril, the burials and the fragmented remains are mostly clustered in the northern

section of the site. Most burials were located within the mounds and displayed signs of disruption after a period of desiccation. These disruptions mostly pertained to the area around the head. The practice of the removal of the cranium caused the cervical vertebrae to be disrupted, which can be observed for several burials (Hofman *et al.* 2020, 141).

The assessment of the macro traces of subaerial exposure as well as other surface modifications on the bones is interpreted in chapter 4. The selection of traces that were visible from the studied photographs all served to provide information regarding the possibility that the bone had been subject to subaerial exposure or human manipulation. From the results, most bones were classified as W1 regarding weathering patterns based on the classification by Behrensmeyer (1987). Bleaching caused by solar radiation was only occasionally observable as most bones were covered in calcareous grey/ ashy concretions, which obscured the surface of the bone. Traces like cutmarks, canid chewing and perimortem dry fractures could only be observed from a photograph. To confirm or deny the status of the trace analysis by a microscope is needed. Several bones of the sample bear traces that could be of interest for further study.

Applying the generalized profile composed in paragraph 5.5 on the dispersed and fragmented bone sample of El Carril several general observations can be recognized. From the Greater and the Lesser Antilles there is a wide variety of burial treatments that can be identified. Evidence has been found that the removal of skeletal elements was performed throughout the Caribbean (Hofman *et al.* 2020, 141). Coincidently, the altered burials prove to have been left open during skeletonization or were desiccated by fire. This has not yet been studied at the site of El Carril, but would be useful to determine the mode of desiccation.

Both the Caribbean and global case studies and the dispersed and fragmented human bone assemblage at the site of El Carril show a bias towards individual bones, namely the cranial and the long bones. This is further elaborated upon later in this chapter. Concerning the meaning or the significance of these bones to these societies, more detailed research into the ontology of the society that occupied the site of El Carril may provide more clarity.

Using the general similarities observed from the worldwide cases, the majority of these adhere to the Caribbean case studies as well as El Carril. This aids in understanding the isolated assemblage as possibly intentional and give the motivation to make further inquiry.

Regarding the archaeological, ethnohistorical and ethnographical cases studied in Chapter 5, there are many parallels discernible. Most notable being the bias toward the cranium. The societies in the case studies all had different motives and beliefs that motivated them to retrieve the skeletal elements. Some believed the cranium represented the spirit of the previous owner who would represent an ancestor and be able to bless the living or curse them in other cases (Wall and Kuschel 1975, 62; Walter *et al.* 2004, 143; Woodford 1890, 142-157; Woods 2012, 101; Armit 2012, 71-83). For other societies, the cranium represented a broader subject like fertility and virility; in this case, there would be a lesser degree of personal connection to the person the cranium belonged to. The cranium would have a lesser purpose as ancestor veneration as opposed to being an object used in ritual practice (Verhoeven 2002, 249-252). There were also cases of alleged cannibalism or mass murder that caused a fragmented assemblage; however, the pattern created by these actions does not compare to the pattern that was found at the site of El Carril.

Another statement we can take from the analysis of isolated bones as part of a burial ritual worldwide is that most often these remains received a particular deposit. A structured deposit would be a way of describing the characteristic manner in which society disposes of their ritual objects. This indicates a generalized practice of deposit and would reinforce the claim that the bone fragments were intentionally deposited. Observing the evidence at El Carril, crucial information is still lacking, notwithstanding that most of the bone fragments were found in ash layers.

Osteological analysis performed by Darlene Weston (2017) on the site of El Flaco, which lies within two kilometres distance of El Carril, revealed a similar situation as found at the site of El Carril regarding the burial population and the dispersal of fragmented human remains. Weston confirmed the burials were subject to open-air desiccation or desiccation aided by fire (Weston 2017, 6; Pagán-Jiménez 2020, 4; Hofman *et al.* 2020, 141), which was also one of the reoccurring practices observed looking back at the literature research in Chapter 5. This

evidence also reinforces the intention to alter the burial after a period of desiccation as it provides access to the deceased, in combination with the conviction that some burials seemed to be altered intentionally to retrieve the cranium or another skeletal element would again reinforce the hypothesis of human interference (Hofman *et al.* 2020, 141). To confirm the site of El Carril also displays evidence of open-air burials or mummification with the aid of fire, an extensive analysis of the burials and the remains as provided by Darlene Weston has to be performed in the future. This evidence would then further reinforce the hypothesis that the bones were intentionally removed by humans. This analysis is planned in the near future when restrictions due to the outbreak of the Covid-19 virus will be lifted.

6.2 Interpretation of the results

There is a trend discernible with the discovered evidence. The majority of the dispersed and fragmented remains were found in close context with the house or the surrounding mounds. The fragments of which the contextual information was available seemed to have been deposited in an ashy soil. Furthermore, a significant part of the assemblage consisted of either cranial bones or long bones. This creates a pattern consistent with some of the case studies assessed in Chapter 5. Taking into account that the bones are deposited in mounds that served multiple purposes but were particularly interred in ashy soils meant to provide the earth with nutrients for horticulture, demonstrates intentionality. This practice would be consistent with human remains representing fertility and virility.

In her report, Weston recounts most of the disarticulated and fragmented remains throughout the site of El Flaco were female. This could be interpreted as a special selection of these remains concerning fertility since females often represent fertility in various cultures throughout the world (Behjati-Ardakani *et al.* 2016; Verhoeven 2002). Future detailed osteological research should be performed on the El Carril assemblage to corroborate the El Flaco findings.

Funerary archaeology has always been essential to learn more about society. About how the dead were treated and how death played a role in daily life. With the evidence from separate

sites throughout the Caribbean displaying the same tendency toward elaborate multistage burial rituals and the presence of dispersed and fragmented remains coupled with burials systematically missing skeletal remains the possibility of a burial practice cannot be excluded. The research performed in this thesis could not execute the full procedure proposed in the methodology due to the current limitations imposed by the COVID-19 pandemic. Nevertheless, the results do bear signs of human manipulation.

Osteological assessment would further be able to either confirm or deny this observation. Therefore this thesis argues that dispersed and fragmented remains should be studied with the same attention formal burials are given. Furthermore, the importance of qualitative research has been demonstrated as it gives more context to the results observed in the quantitative stage of research. Moreover, it gives a hint towards the interpretation of the possible burial rites performed. More research will be able to provide a more complete understanding of burial practices as well as the society in question.

The next chapter will provide a conclusion as to the arguments made in this thesis and look into the prospects for future research.

Chapter 7: Conclusion

7.1 introduction

The aim of this thesis was to identify the cultural context of the dispersed and fragmented human bones at El Carril and to propose a generalized practice for researching fragmented human bone assemblages in the context of a burial ritual. This research aimed to:

- analyse the dispersed and fragmented human bone assemblage found at El Carril site in the northern Dominican Republic. This research would help to discriminate between cultural displacement and natural processes.
- Identify archaeological or ethnographical case studies of elaborate multistage burial rituals in the Caribbean and worldwide context that resulted in the fragmentation and dispersal of human bones.
- Describe any reoccurring habitual patterns which could help identify such practices and will aid in creating a framework which is applicable for research regarding dispersed and fragmented human bones.
- Combine research methods to determine the actor in the process of the dispersal of human remains as a result of a burial ritual. This research would be based on previous scientific research and the reoccurring habitual patterns observed in cases in the wider Caribbean and worldwide.

The research of the archaeological and ethnographical case studies provided a wealth of information on the different practices throughout the Caribbean and the world that could result in the dispersal and the fragmented human bones. Furthermore, these case studies indicate the importance of the study of burial rituals as part of understanding life- and death-ways in the context of that society. A better understanding of the burials traditions and their

place in society could provide a better insight into the ontology and possibly ancestor veneration practices or other rituals (like virility, fertility rituals).

Often when studying burial treatment, dispersed and fragmented human remains are deemed the result of natural or physical processes and are therefore omitted from proper study. The research in this thesis argues the importance of these remains in understanding burial treatments and rituals. Increasingly, osteoarchaeologists are adopting research methods that could assist in determining the nature of the dispersal of these bone fragments. This thesis intended to propose a set of research methods which can be used to investigate the origin of these dispersed and fragmented human remains.

Due to the current Covid-19 situation, this research was limited to the available stored in the NEXUS1492 database. Many elements of the method were dependant on the personal examination of the material and the completeness of the context information. However, within the possibilities, the study did contribute to the understanding of the dispersed and fragmented remains at El Carril. Although the results did not provide any conclusive evidence of human engagement, they do hint towards some degree of manipulation.

More detailed research will be able to provide better and scientifically substantiated results. Additional possibilities regarding research methods that would substantiate the claims do rely on the possibility of personal examination of the remains

7.2 Future research

In my future research on this topic, I wish to perform a qualitatively better analysis to provide more substantiated conclusions. I would like to build on studies that have attempted to propose a generalized method to research dispersed and fragmented remains and determine if these remains were dispersed and fragmented by human actors. These studies use many of the techniques described in this thesis, but also refer to more advanced macro trace analysis techniques to determine the actor responsible for the dispersal of the human bone. These namely include rounding of fracture edges; breakage patterns; quality of the cortical surface; estimates of age at death divided into two rough categories, juvenile and adult; assessing

evidence of exposure to fire; description of carnivore and rodent gnaw marks; identification of cutmarks scrape marks, and trample marks; detecting dying with ochre using X-ray Powder Diffraction (XRD) and Microscopic bioerosion (Lara *et al.* 2016; Booth and Madgwick 2016). The assessment of the rounding of the edges of the fracture, the quality of the cortical surface, breakage pattern and the exposure to fire can be performed without a magnification tool. Ideally, further assessment under a low-power stereomicroscope is coupled with the identification using the naked eye to confirm findings done by the naked eye. This information will provide more insight into the timing of the fracture, the duration of aerial exposure and the treatment after death regarding a fire.

Further research of interest to this subject would involve examining if the dispersed and fragmented remains (mostly the larger, more complete fragments) can be reassociated to the burials found at the site. This would reinforce the claim that the bones were part of local practice. This is a lengthy process and also not infallible as in archaeology the assemblage is a sample of a sample, the data, therefore, is always incomplete. If no connections are made in the current assemblage, it does not necessarily mean that there is no possibility of reassociation of the dispersed and fragmented remains to other not yet excavated burials.

Bibliography

Allsworth-Jones, P., 2008. *Pre-Columbian Jamaica*: Tuscaloosa: University of Alabama Press.

Armit, I., 2012. *Headhunting and the Body in Iron Age Europe*: Cambridge University Press.

Barker, F., P. Hulme and M. Iversen, 1998. *Cannibalism and the colonial world*: Cambridge: Cambridge University Press.

Behrensmeyer, A.K., K.D Gordon and G.T. Yanagi, 1986. Trampling as a cause of bone surface damage and pseudo-cutmarks. *Nature, 319*(6056), 768. doi:10.1038/319768a0

Behrensmeyer, A. K., 1978. Taphonomic and ecologic information from bone weathering. *Paleobiology, 4*(2), 150-162.

Behjati-Ardakani, Z., M.M. Akhondi, H. Mahmoodzadeh and S.H. Hosseini, 2016. An Evaluation of the Historical Importance of Fertility and Its Reflection in Ancient Mythology. *Journal of Reproduction and Infertility*, 17(1), 2-9.

Belfer-Cohen, A., 1988. The Natufian graveyard in Hayonim cave. *Paléorient*, 297-308.

Bello, S., R. Wallduck, S. Parfitt and C. Stringer, 2017. An Upper Palaeolithic engraved human bone associated with ritualistic cannibalism. *PLoS One, 12*(8), e0182127. doi:10.1371/journal.pone.0182127

Bonogofsky, M., 2001. Cranial modelling and Neolithic bone modification at'Ain Ghazal: New interpretations. *Paléorient*, 141-146.

Boomert, A., 2019. The first settlers: Lithic through Archaic times in the coastal zone and on the offshore islands of northeast South America. In Hofman, C. and A. Antczak, 2019. *Early Settlers of the Insular Caribbean*. Leiden: Sidestone Press.

Booth, T. J. and R. Madgwick, 2016. New evidence for diverse secondary burial practices in Iron Age Britain: A histological case study. *Journal of Archaeological Science, 67*(C), 14-24. doi:10.1016/j.jas.2016.01.010

Bradley, R., 2003. A Life Less Ordinary: the Ritualization of the Domestic Sphere in Later Prehistoric Europe. *CAJ, 13*(1), 5-23. doi:10.1017/S0959774303000015

Bradley, R., 2005. *Ritual and Domestic Life in Prehistoric Europe*: London: Routledge.

Colombo, C., H. Colon and J.M. Cohen, 1969. *The four voyages of Christopher Columbus : being his own log-book, letters and dispatches with connecting narrative drawn from the Life of the admiral by his son Hernando Colon and other contemporary historians*: Harmondsworth, Middlesex: Penguin Books.

Crespo-Torres, E. F., H.L Mickleburgh and R.V Rojas, 2013. The Study of Pre-Columbian Human Remains in the Caribbean Archipelago. *The Oxford Handbook of Caribbean Archaeology*, 436.

Crespo-Torres, E. F., 2010. *Ancient bones tell stories : osteobiography of human remains from Tibes*.

Croucher, K., 2018. Keeping the dead close: grief and bereavement in the treatment of skulls from the Neolithic Middle East. *Mortality, 23*(2), 103-120. doi:10.1080/13576275.2017.1319347

Curet, L. A. and J.R. Oliver, 1998. Mortuary Practices, Social Development, and Ideology in Precolumbian Puerto Rico. *Latin American Antiquity, 9*(3), 217-239. doi:10.2307/971729

Duday, H., 2009. *The archaeology of the dead : lectures in archaeothanatology*: Oxford: Oxbow Books.

Duijvenbode, A., 2017. *Facing society : A study of identity through head shaping practices among the indigenous peoples of the Caribbean in the ceramic age and colonial period*. Leiden (unpublished Ph.D. thesis University of Leiden).

Ensor, B. E., 2013. Kinship and social organization in the Pre-Hispanic Caribbean. *The Oxford handbook of Caribbean archaeology.*

Fewkes, J., 1903. Prehistoric Porto Rican Pictographs. *American Anthropologist, 5*, 441.

Frayer, D. W. and D.L. Martin, 1997. *Ofnet: Evidence for a Mesolithic Massacre*: Routledge.

Geber, J. and E. Murphy, 2012. Scurvy in the Great Irish Famine: Evidence of vitamin C deficiency from a mid-19th century skeletal population. *Am J Phys Anthropol, 148*(4), 512-524. doi:10.1002/ajpa.22066

Goren, Y., A.N. Goring-Morris, and I. Segal, 2001. The Technology of Skull Modelling in the Pre-Pottery Neolithic B (PPNB): Regional Variability, the Relation of Technology and Iconography and their Archaeological Implications. *Journal of Archaeological Science, 28*(7), 671-690. doi:https://doi.org/10.1006/jasc.1999.0573

Hill, A. and A.K. Behrensmeyer, 1984. Disarticulation patterns of some modern East African mammals. *Paleobiology, 10*(3), 366-376.

Hageman J. and E. Hill, 2016. The Archaeology of Ancestors. In *The Archaeology of Ancestors Death, Memory, and Veneration.* Gainesville : University Press of Florida.

Hocart, A., 1922. The Cult of the Dead in Eddystone of the Solomons. Part I. *Journal of the Royal Anthropological Institute of Great Britain and Ireland, 52*, 71.

Hofman, C.L., M. Hoogland and L. van Gijn, 2008. *Crossing the borders : New methods and techniques in the study of archaeological materials from the Caribbean*. Tuscaloosa, Alabama: University of Alabama Press.

Hofman, C., 2017. Informe de trabajo de campo de 2017. *Faculty of Archaeology, Leiden University, Leiden Prospecciones y excavaciones a nivel intrasitio en la República Dominicana por la Universidad de Leiden (Países Bajos) y Nexus*.

Hofman, C. L., J.U. Hung, E.H. Malatesta, J.S. Jean, T. Sonnemann and M. Hoogland, 2018. Indigenous Caribbean perspectives: archaeologies and legacies of the first colonised

region in the New World. (Report). *Antiquity, 92*(361), 200. doi:10.15184/aqy.2017.247

Hofman, C. L. and J. Ulloa Hung, 2019. NEXUS 1492: Encuentros del Nuevo Mundo con un mundo en globalización. *Ciencia y sociedad, 44*(4), 95-115. doi:10.22206/cys.2019.v44i4.pp95-115

Hofman, C. and A. Antczak, 2019. *Early Settlers of the Insular Caribbean*. Leiden: Sidestone Press.

Hofman C.L, M. Hoogland. And J.R. Pagán-Jiménez, 2020. *En la víspera de la colonización europea: los sitios indígenas el flaco, el carril y el cabo, república dominicana*. In (pp. 133-152). Facultad de Arqueología, Universidad de Leiden, Países Bajos.

Hoogland, M., 1997. Rites Funeraires Dans La Region Circum-Caraibe. University of Leiden.

Hoogland, M., 1998. Rites Funeraires Dans La Region Circum-Caraibe. University of Leiden.

Hoogland, M., 1999. Rites Funeraires Dans La Region Circum-Caraibe. University of Leiden.

Hoogland, M., and Hofman, C., 1993. Kelbey's Ridge 2, A 14th Century Taíno Settlement on Saba, Netherlands Antilles. *Analecta, 26*, 20.

Huculak, M. A. and T.L Rogers, 2009. Reconstructing the Sequence of Events Surrounding Body Disposition Based on Color Staining of Bone. *J Forensic Sci, 54*(5), 979-984. doi:10.1111/j.1556-4029.2009.01086.x

Hutton, J. H., 1965. The Mixed Culture of the Naga Tribes. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 95*(1), 16-43. doi:10.2307/2844208

Kanungo, A. K., 2011. Ornaments of the dead among the Nagas. Paper presented at the *Journal of the Borneo International Beads Conference* (Freya Martin and Heidi Munan Eds.), Malaysia.

Keegan, W.F., C.L. Hofman and R. Rodríguez Ramos, 2013. The Oxford handbook of Caribbean archaeology. Oxford [etc.]: Oxford University Press.

Keegan, W. F. and M.D. Maclachlan, 1989. The evolution of avunculocal chiefdoms: a reconstruction of Taino kinship and politics. *American Anthropologist, 91*(3), 613-630.

King, C., 1887. A naga burial. *Baptist Missionary Magazine (1873-1909), 67*(4), 100.

Knüsel, C. J., 2014. Crouching in fear: Terms of engagement for funerary remains. *Journal of Social Archaeology, 14*(1), 26-58.

Kuijt, I., 2008. The Regeneration of Life. *Current Anthropology, 49*(2), 171-197. doi:10.1086/526097

Lara, M., A. Mijares, D. Satumbaga, L. Castro, J. Ramos and E. Recto, 2017. Archaeological recognition of mortuary behavior in Callao Cave, northern Luzon, Philippines through taphonomic analysis of isolated human remains. *Archaeological and Anthropological Sciences, 9*(6), 1169-1186. doi:10.1007/s12520-015-0307-7

Lefranc, P., A. Denaire, C. Jeunesse and B. Boulestin, 2018). Dismembering bodies and atypical human deposits of the 4th millennium cal BC in the Upper-Rhine valley: Part of sacrificial practices? In P. Bickle and E. Sibbesson (Eds.), *Neolithic Bodies* (Vol. 15, pp. 92-112): Oxbow Books.

Lynn, C., C. Penn, M. McCorry, M. Delaney, M. and R. Larmour, 1977. Trial excavations at the King's Stables, Tray Townland, County Armagh. *Ulster Journal of Archaeology*, 42-62.

Maat, G. J. R., 2004. Scurvy in adults and youngsters: the Dutch experience. A review of the history and pathology of a disregarded disease. *International journal of osteoarchaeology, 14*(2), 77-81. doi:10.1002/oa.708

Mickleburgh, H. L., J.E. Laffoon, J.R. Pagán Jiménez, A.A.A Mol, S. Walters, Z.J.M. Beier and C.L. Hofman, 2019. Precolonial/early colonial human burials from the site of White Marl,

Jamaica: New findings from recent rescue excavations. *International Journal of Osteoarchaeology, 29*(1), 155-161. doi:10.1002/oa.2707

Mickleburgh, H. L. and D.J Wescott, 2018. Controlled experimental observations on joint disarticulation and bone displacement of a human body in an open pit: Implications for funerary archaeology. *Journal of Archaeological Science: Reports, 20*, 158-167. doi:https://doi.org/10.1016/j.jasrep.2018.04.022

Miller, G. J., 1975. Weathering cracks, fractures, splinters, and other similar natural phenomena. *Lithic Technology: Making and Using Stone Tools*, 211-226.

Morales-Pérez, J. V., D.C. Salazar-García, M.P. de Miguel Ibáñez, C. Miret I Estruch, J.F Jordá Pardo, C.C. Verdasco Cebrián and J.E. Aura Tortosa, 2017. Funerary practices or food delicatessen? Human remains with anthropic marks from the Western Mediterranean Mesolithic. *Journal of Anthropological Archaeology, 45*(C), 115-130. doi:10.1016/j.jaa.2016.11.002

Morlan, R. E., 1984. Toward the definition of criteria for the recognition of artificial bone alterations. *Quaternary Research, 22*(2), 160-171. doi:10.1016/0033-5894(84)90037-1

Morris, I., 1989. *Burial and ancient society: the rise of the Greek city- state*: Cambridge [England]: Cambridge University Press.

Nägele, K., C. Posth, M. Iraeta Orbegozo, Y. Chinique de Armas, S.T. Hernández Godoy, U.M. González Herrera, M.A Nieves-Colón, M. Sandoval-Velasco, D. Mylopotamitaki, R. Radzeviciute, J. Laffoon, W.J. Pestle, J. Ramos-Madrigal, T.C. Lamnidis, W.C. Schaffer, R.S. Carr, J.S. Day, C. Arredondo Antúnez, A. Rangel Rivero, A.J. Martínez-Fuentes, E. Crespo-Torres, I. Roksandic, A.C. Stone, C. Lalueza-Fox, M. Hoogland, M. Roksandic, C.L. Hofman, J. Krause, H. Schroeder, 2020. Genomic insights into the early peopling of the Caribbean. *Scienc*e (American Association for the Advancement of Science), 369(6502), Eaba8697-460.

O'shea, J. M., 1984. *Mortuary variability: an archaeological investigation*: Academic Pr.

Olsen, S. L. and P. Shipman, 1988. Surface modification on bone: Trampling versus butchery. *Journal of Archaeological Science, 15*(5), 535-553. doi:10.1016/0305-4403(88)90081-7

Outram, A., C.J. Knusel, S. Knight and A. Harding, 2005. Understanding complex fragmented assemblages of human and animal remains: a fully integrated approach. *J. Archaeol. Sci., 32*(12), 1699-1710. doi:10.1016/j.jas.2005.05.008

Pagán-Jiménez, J. R., Z. Ali, C.G. Santiago-Marrero and C.L. Hofman, 2020. Plantscapes of dwelling: Precolonial household mounds, phytocultural dynamics and the ensuing human ecosystems at El Flaco and El Carril (cal. AD 990-1450), northern Dominican Republic. *Review of Palaeobotany and Palynology, 274*. doi:10.1016/j.revpalbo.2020.104160

Pané, R. and J. Arrom, 1999. *An account of the antiquities of the Indians : Chronicles of the New World encounter* (New ed. / with an introd. study, notes, and appends. by José Juan Arrom ; transl. by Susan C. Griswold. ed., Latin America in translation/en traducción/em tradução 239808576). Durham, NC: Duke University Press.

Peressinotto, D., 2007. Chronologie de la dislocation articulaire du squelette axial et des ceintures au cours de la décomposition du cadavre. Apports à l'analyse des sépultures. *Unpublished Ph. D. dissertation, University of Bordeaux*.

Pokines, J., S.A. Symes and C. Roper, 2013. *Manual of Forensic Taphonomy*. doi:10.1201/b15424

Pokines, J. T. and S.A. Symes, 2014. *Manual of forensic taphonomy*: Boca Raton : CRC Press, Taylor and Francis Group.

Pollock, C. R., J.T. Pokines and J.D. Bethard, 2018. Organic staining on bone from exposure to wood and other plant materials. *Forensic Sci Int, 283*, 200-210. doi:10.1016/j.forsciint.2017.12.021

Redfern, R., 2008. New evidence for iron age secondary burial practice and bone modification from gussage all saints and maiden castle (dorset, england). *Oxford journal of archaeology, 27*(3), 281-301. doi:10.1111/j.1468-0092.2008.00308.x

Roe, P. G., A.G. Pantel, A. G. and M.B. Hamilton, 1990. *Monserrate restudied: The 1978 Centro field season at Luquillo Beach: Excavation overview, lithics and physical anthropological remains.* Paper presented at the Proceedings of the Eleventh Congress of the International Association for Caribbean Archaeology, La Fundación Arqueolóngica, Antropológica e Histórica de Puerto Rico, San Juan.

Roksandic, M. Position of skeletal remains as a key to understanding mortuary behavior. *Advances in forensic taphonomy: method, theory, and archaeological perspectives*, 99-117.

Roksandic, M., 2002. Position of skeletal remains as a key to understanding mortuary behavior. *Advances in forensic taphonomy: method, theory, and archaeological perspectives*, 99-117.

Sauer, N. J., 1998. The timing of injuries and manner of death: distinguishing among antemortem, perimortem and postmortem trauma. *Forensic osteology: advances in the identification of human remains*, 321-332.

Sellier, P. and J. Bendezu-Sarmiento, 2013. Différer la décomposition: le temps suspendu?. Les signes d'une momification préalable. *Les Nouvelles de l'archéologie*(132), 30-36.

Shahack-Gross, R., O. Bar-Yosef and S. Weiner, 1997. Black-Coloured Bones in Hayonim Cave, Israel: Differentiating Between Burning and Oxide Staining. *Journal of Archaeological Science, 24*(5), 439-446. doi:10.1006/jasc.1996.0128

Shev, G., 2018. *Feeding Opiyelguobirán: A multidisciplinary analysis of human-canid relations in pre-colonial Hispaniola.* Faculty of Archaeology, Leiden university

Shipman, P., G. Foster and M. Schoeninger, 1984. Burnt bones and teeth: an experimental study of color, morphology, crystal structure and shrinkage. *Journal of Archaeological Science, 11*(4), 307-325. doi:10.1016/0305-4403(84)90013-X

Smith, M., 2006. Bones chewed by canids as evidence for human excarnation: a British case study. *Antiquity, 80*(309), 671-685. doi:10.1017/S0003598X00094126

Sonnemann, T.F., J. Ulloa Hung & C.L. Hofman. 2016. Mapping indigenous settlement topography in the Caribbean using drones. *Remote Sensing* 8: 791.

Sued-Badillo, J., 1992. Facing Up To Caribbean History. *American Antiquity*, 57(4), 599-607.

Ting, C., B. Neyt, J. Ulloa Hung, C.L. Hofman and P. Degryse, 2016, The production of pre-Colonial ceramics in northwestern Hispaniola: A technological study of Meillacoid and Chicoid ceramics from La Luperona and El Flaco, Dominican Republic., *Journal of Archaeological Science Reports* 6: 376-385.

Torres, J. M., 2005. Deconstructing the polity: communities and social landscapes of the ceramic-age peoples of south central Puerto Rico. In (pp. 202-229.). *Ancient Borinquen: Archaeology and Ethnohistory of Native Puerto Rico*.

Ubelaker, D. H., 1997. Taphonomic applications in forensic anthropology. *Forensic taphonomy: the postmortem fate of human remains*, 77-90.

Van der Spelde, F., 2016. *Wandering Bones and Peripheral Bodies. Multidisciplinary analysis of the human remains from the early medieval (AD 500-700) settlement at Oegstgeest, the Netherlands. Leiden (unpublished master thesis University of Leiden).*

Veloz Maggiolo, M., 1972. Arqueología Prehistórica de Santo Domingo. *MCGrew Hill Eastern Publishers (s} Ltd. Sinagapore*, 120.

Verhoeven, M., 2002. Ritual and Ideology in the Pre-Pottery Neolithic B of the Levant and Southeast Anatolia. *CAJ, 12*(2), 233-258. doi:10.1017/S0959774302000124

Versteeg, A.H., K. Schinkel and S.M. Wilson, 1993. *Large-scale excavations versus surveys: Examples from Nevis, St. Eustatius and St. Kitts in the Northern Caribbean*. 26, 26.

Versteeg, H. and K Schinkel, 1992. *The archaeology of St. Eustatius : The Golden Rock site* (Publication of the St. Eustatius Historical Foundation ; no. 2 111889030). St. Eustatius : Amsterdam: The St. Eustatius Historical Foundation ; The Foundation for Scientific Research in the Caribbean Region.

Villa, P. and E. Mahieu, 1991. Breakage patterns of human long bones. *Journal of Human Evolution, 21*(1), 27-48. doi:10.1016/0047-2484(91)90034-S

Wall, L. and R. Kuschel, 1975. Burial customs and grave sites on pre-christian nggatokae, western solomon islands. *Archaeology and Physical Anthropology in Oceania, 10*(1), 55-66. doi:10.1002/j.1834-4453.1975.tb00213.x

Walter, R., T. Thomas and P. Sheppard, 2004. Cult assemblages and ritual practice in Roviana Lagoon, Solomon Islands. *World Archaeology: The object of dedication, 36*(1), 142-157. doi:10.1080/0043824042000192614

Weston, D., 2017. Human Skeletal Report El Flaco, Dominican Republic. In (pp. 1-63). The University of British Columbia: unpublished.

White, L. and T.J. Booth, 2014. The origin of bacteria responsible for bioerosion to the internal bone microstructure: Results from experimentally-deposited pig carcasses. *Forensic Sci Int, 239*, 92-102. doi:10.1016/j.forsciint.2014.03.024

White, T. D. and P.A. Folkens, 2005. *Human Bone Manual*: San Diego: Elsevier Science and Technology.

Woodford, C. M., 1890. *A Naturalist among the Head-Hunters: being an account of three visits to the Solomon Islands in the years 1886, 1887, and 1888*: London; Liverpool: Philip.

Woods, E. D., 2012. The last happy skull.(headhunting Naga tribes in northwest Myanmar)(Essay). *The Virginia Quarterly Review, 88*(3), 84-107.

Appendix